COMPUTERWORLD

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NEWSPAPER

WANTED:

Tartar

Hopper

CW Photos by V.J. Farmer

David

Bell

The Ideal Minicomputer

By a CW Staff Writer

BOSTON – The ideal minicomputer should be built from a wide range of interchangeable and compatible components that can be custom fit to the user's application without any problems, a user-industry panel agreed here recently.

Moreover, the technology to build this ideal mini is here today, the three users from different operating environments and two vendor engineering people said at the Digital Equipment Computer Users Society (Decus) meeting.

Jon David, president of Systems RDI Corp., a custom minisystems design house, put together a panel including: Capt. Grace Hopper; John Tartar, computer science professor from the University of Alberta; Gordon Bell, vice-president of engineering at DEC; and Terry Opendyk, manager of software development, microcomputer systems group at Intel Corp.

Opendyk said vendors have too long taken the tack of developing minicomputers within the emerging technology, and it is time to design minicomputers that fit the users' needs more precisely.

The basic machine concepts such as registers, instruction sets, and basic I/O formats should be removed from the direct user interface, he said.

A user today may have to spend more money debugging an application than he would have if he could buy a more user-compatible unit that can be built with today's technology.

Living in the Past

Bell suggested many of the constraints features everyone wants may just not be necessary, because people predicate a whole structure on the past without knowledge of what the future technology holds.

Hopper agreed, noting that "today's decisions should be taken in light of all possible future events, and the decisions made today should be viable five to 10 years from now. If we can understand what computers will be like in the future, we can better decide what we can do today."

We are producing improvements faster than this technology can be put to effec-

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CIG's Block Multiplexer Provides 360s With RPS

By Vic Farmer
Of the CW Staff

STAMFORD, Conn. – For less than the price of an IBM 2860 selector channel, users of IBM 360/65 and up and 370/165 and up systems can get an IBM 2880-equivalent block multiplexer channel with rotational position sensing capability from Computer Investors Group (CIG). The IBM 2880 is limited to 370 systems.

The CIG 6780 block multiplexer channel, the first independently available channel for large IBM machines, allows 360/65s and larger machines to attach IBM 3330 and 3330-11 disk drives, IBM 2305 fixed-head disks, Storage Technology Corp. Superdisks and most independent 3330/3330-11-type replacements to their mainframes without software modification.

Several independent suppliers of 3330-type disk systems previously allowed users to attach their disks to 360s but software modifications were required. The 6780 is a hardware-interfaced system.

The CIG 6780 apparently marks the first time IBM peripherals (3330 systems) must depend on non-IBM equipment to operate on 360 mainframes.

In at least one case, an IBM salesman has recommended that a user install a CIG 6780 so the IBM 3330 disks could be attached to a 360.

Asked whether IBM salesmen could suggest non-IBM equipment to a customer, an IBM spokesman said, "IBM personnel are prohibited from influencing customers in their purchase (or lease) of non-IBM products and services. Any violation subjects the employee to strict disciplinary action."

However, if a salesman sold 3330s for attachment to a system that has non-IBM components such as the CIG block multiplexer channel, he would get credit for the sale, IBM said. In such cases, the customer rather than the salesman would have to initiate a request for the IBM equipment.

The 6780 runs standard IBM diagnostic software, according to CIG. And in cases where an IBM 360 system is malfunctioning, it could be important for the IBM customer engineer (CE) to determine whether the CIG channel is operating properly. In one instance, IBM is reported to have suggested to a customer that the IBM diagnostics be run on the 6780 so that system fault isolation could continue.

Under IBM's multivendor maintenance directive, IBM will maintain its own drives in mixed vendor systems on a best efforts basis. Much of the IBM 3330 diagnostics can be run in stand-alone operation because diagnostic electronics are contained in the 3330's controller, the IBM 3333, an IBM spokesman said.

The CIG 6780 can connect up to 56 3330-type spindles and has one additional

(Continued on Page 2)

Bill Would Force AT&T To Permit Interconnection

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – A bill has been introduced in Congress that would require telephone companies to interconnect customer-provided equipment based on Federal Communications Commission standards.

The legislation was introduced by Rep. Bertram Podell (D-N.Y.) who told the House, "The FCC must replace AT&T as the controlling force in the new field of interconnect.

"Bell and friends are . . . hiking the cost of interconnection equipment up to a level consistent with their own charges [and] they are making a nice profit on 'self-protection,'" Podell said.

The congressman said, "AT&T, and AT&T alone, has been the judge of whether or not equipment must be interfaced. It has enforced the interfacing requirement . . . whether or not the equipment is electrically harmful to their lines. AT&T thereby regulates its competition," Podell charged.

Podell's bill, H.R. 14848, would amend the Communications Act of 1934 to add a section called Subscriber Provided Telephone Equipment. It would allow the attachment of "any equipment apparatus

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Nongovernment Users to Benefit From GSA Performance Studies

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – The performance guidelines to be developed by the General Services Administration's (GSA) new computer performance evaluation (CPE) office [CW, June 5] will be available to DP installations everywhere. And the management of DP sites both in and out of government will be more involved in the new office than originally indicated, according to a GSA spokesman.

GSA will be working with data already collected by the Federal Simulation Center (Fedsim) in CPE projects done for individual client agencies.

Fedsim was organized nearly two years ago to provide a centralized source of CPE expertise for any agency funded by the government. By now, Fedsim has a long enough record so that there have been many very similar projects and many similar findings. These could be applied in new situations, "without calling the Fedsim guys," a GSA source noted.

GSA will purge Fedsim's individual reports of client references, then determine profiles of apparently effective sites with various configurations of CPU model, peripherals, workload, etc. These norms should give DP managers some indication of how well their shops are performing compared with similar installations.

Representative Sites

Hopefully, user comments about the original norms, and data received from sites not included in the Fedsim studies, will allow GSA to modify the norms until they finally do provide a good representation of an effective site with rather specific hardware and software environments.

The CPE office will start up with the new fiscal year, July 1. Planning to determine where the office belongs in GSA's

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Rutgers-N.J. System Still Hanging

NEW BRUNSWICK, N.J. – The battle for control of a Decsystem-10 still goes on between Rutgers – the N.J. state university – and the State Department of Higher Education [CW, May 29].

"Rutgers is still talking with the Department of Higher Education," said Eugene Young, Rutgers assistant vice-president for academic affairs, "trying to come up with an amicable solution that permits us to use the computer for what we see as its primary purpose – research in advanced time-sharing projects."

"There really is no fight between us and the department on the need for this computer to provide the kind of service we're talking about," he said. "The core issue is, shall the computer be owned and operated by Rutgers, or shall it be owned and operated by the statewide network."

The Department of Higher Education recommended to the governor that $600,000 in its budget be used to purchase the computer for the statewide network, Education Information Services (EIS). The governor sent the budget to the legislature, but reduced the amount to $200,000 for the state network.

The legislature's budget committee approved this amount and sent the budget back to the governor for his signature. The committee did not cut out any money pertaining to the computer, Young said.

The cost of the total hardware, according to Young, is $656,000 which, with interest, comes to $800,000 over the five-year purchase period. "So actually the cost per year is around $160,000," Young said. "We have the money to cover the first year's cost."

Referring to the yet undecided outcome of the struggle for control of the system, Young said that if an amicable solution is not found, it could result in the Department of Higher Education trying to take some kind of sanction against the university, "and that would most likely be a financial one," which could affect the 1975-76 budget.

ABA Culling Computer Transcripts For Watergate-Related Lawyers

By Nancy French
Of the CW Staff

CHICAGO – Using a computerized transcript of the Ervin Committee hearings, the disciplinary unit of the American Bar Association (ABA) has sent names of attorneys accused of wrongdoing in connection with the Watergate affair to each attorney's home state to advise local officials of the attorney's possible guilt.

Lamar Forshee, director of the ABA's National Center for Discipline, explained this was being done because the ABA itself has no disciplinary authority.

"Many attorneys have been found guilty of misconduct in the Watergate affair already, and it is the feeling in the profession that in the event of such misconduct, the licensing state should investigate and bring charges against offenders. These cases shouldn't be ignored," Forshee said.

"We are merely acting as a conduit to inform each state of alleged misconduct on the part of an attorney licensed to practice in that state. Then local authorities can proceed with investigation, appropriate charges and disciplinary action," he said.

"By no means are we circulating any computerized list of names from state to state," he said.

The disciplinary unit obtained the names of possibly guilty attorneys by sifting through a transcript of the Ervin Committee hearings, computerized by the Library of Congress.

After obtaining the names from the transcript, ABA officials wrote a letter to the state body responsible for admitting each attorney to practice.

"The letter told them information concerning the alleged misconduct of 'one of their members' has come to our attention, and if they are interested in investigating the matter, they may contact us for further details," Forshee said.

"Although the transcripts are a matter of public record, they are lengthy, and many states have not gone to the trouble of sifting through them," he explained.

At present, a number of states are investigating charges of misconduct against their members – California, for example, is investigating six charges; New York, four; and the State of Washington, two, according to Forshee.

Disciplinary action varies from state to state with suspension – or the lifting of an attorney's license to practice law for a specific period of time – one penalty. Disbarment – the lifting of an attorney's license for an indefinite period – can put an attorney out of business for life in a state such as New York.

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$10,000 in Unemployment Checks
Combined Duties Lead to Theft

BATON ROUGE, La. – "Beware," warned Silas Garvin of the Louisiana State Department of Employment Security, who learned the hard way that "you can design a beautiful system, but the system depends upon the right people in the right jobs to make it work."

Garvin said he thought they had such a system. Although they had some personnel problems which resulted in their doubling up on some jobs now and then, things seemed to be moving along pretty smoothly until a new employee discovered that nearly $10,000 in unemployment checks had been issued to the same person over a five-month period.

After a bit of investigation, it was found that Nancy Wicker, an employee of the department for five years, had had certain monitoring duties added to her input responsibilities when the office was shorthanded. She soon realized how she could fool the system and initiate checks for her own benefit, investigators charged.

When unemployment claims are filed in Louisiana's mail-claim system, the information is stored on disk. Often a claimant has worked for several employers during the course of a calendar year, and each employer must reply to an inquiry from Employment Security detailing the earnings of the claimant so his eligibility can be determined.

Because of the inherent delay in this procedure, a "catch-up" feature is built into the system for issuing a multiple check to cover accrued payments. Once a payment check is initiated, a record of payment is also stored on disk.

$400 a Week

When Wicker was assigned monitoring duties, she soon learned she could initiate a check – a multiple one of $400 each week – and then delete it from the disk record, investigators said. The only aspect of payment that she could not control was the offsetting entry in the audit routine.

And that's what finally tripped her up, they indicated.

A new employee was brought in to run an audit and he discovered the overpayments.

"We went wrong by putting one employee in a position where she could control both the input and monitoring function, and it took five months for our system to pick it up," Garvin commented.

Normally, he explained, the system would have been safeguarded by limiting the responsibilities of employees and their access to the computer.

A first-time offender, Wicker has been given a suspended sentence, with supervised parole for five years.

CIG Channel Gives 360s RPS

(Continued from Page 1)

shared channel. Users have the option of modifying the one shared channel to accommodate eight additional nonshared block multiplexing channels to give access to a maximum of 64 3330-type spindles.

Faster Throughput

CIG claims a 360/65 with a 6780 and 3330-type drives will provide a user with throughput equivalent to a 370/155. The 6780 is also said to be about 15% faster than software methods of connecting 3330-type drives to a 360/65.

The main differences between the hardwired IBM 2880 and the CIG 6780 is that the 6780 consists of a small computer with 4K of semiconductor memory. The unit utilizes a floppy disk for microprogramming, so the 6780 can be field-upgraded (new floppy diskette and a circuit board) for 370 CPUs.

The 6780 is also one third the size of the IBM 2880, and operates under OS version 20.6.

For 370 users, the 6780 is about $700/mo less expensive including maintenance than the IBM 2880.

CIG has six 6780s installed and can be reached at 65 Washington Ave., 06902. Delivery is within 30 days.

	IBM 2860	IBM 2880	CIG 6780
Purchase Price	$99,800	$155,000	$80,000
Monthly Lease	$2,140/mo (MAC)	$3300/mo (MAC)	$2,000/mo (two-year lease $600/mo maintenance)

Price Comparison of IBM, CIG Channels

ABA Data Bank Lists Disciplined Members

CHICAGO – The American Bar Association (ABA) has begun to employ computer technology to purge from its ranks lawyers accused of misconduct.

According to Lamar Forshee, director of the ABA's National Center for Discipline, the name of every attorney who has been disciplined – suspended or disbarred – in any individual state goes into a national data bank maintained by the association.

The ABA now is printing out and circulating this list quarterly from its headquarters here to insure that the information is available to every state where the attorney is licensed to practice law.

Forshee emphasized that the names appearing on this list are people who have been found guilty and disciplined by their state licensing authorities. In most cases this is the State Supreme Court or the State Bar Association.

"They are not people about whom misconduct merely has been alleged," he said.

"With this new system, there is little likelihood today that an attorney can continue the practice of law after disbarment by simply changing his or her state of residence," he explained.

Assembly Committee Drops Teale Funding

SACRAMENTO, Calif. – The California Assembly Ways and Means Committee decided last week to strip all funding from the Teale Data Center for the next fiscal year. This decision contrasts with the Senate vote, which reduced the budget by about $5.6 million.

The material has been referred to the conference committee, which is expected to meet this week. The deadline for approving the state budget is June 15.

The Ways and Means Committee also declined to fund the central EDP office in the department of finance, which includes the state data processing officer, Fulton Smith, and all the centralized EDP staff, sources indicated.

Controlling the EDP Environment

ADR Announces Enhanced Autoflow II System

PRINCETON, N.J.—Applied Data Research offers a new EDP approach to IBM 360/370 DOS and OS installations. AUTOFLOW II users can extend control, improve productivity, and optimize communications throughout the entire program/system development cycle.

Enhanced with exclusive systems-oriented facilities, this widely used software product has been transformed into a dynamic development tool. With scope extended to pre-coding and post-coding activities, the combined facilities of AUTOFLOW II offer a disciplined approach to total systems management.

These new dimensions of AUTOFLOW II span the entire system development cycle—from design through implementation, verification, and maintenance.

Benefits of the AUTOFLOW II environment include: comprehensive management review facilities; operational system support; accelerated development progress; control of programming resources; stabilized development procedures; and well-defined directions for all development tasks.

The total AUTOFLOW II environment is created and sustained through four unique options:

- *Module Analysis Processors (MAP)*—accept and analyze over 20 different source languages to produce extensive cross-referenced listings, summary analyses, and graphic charts focusing on various aspects of program activity and logic.
- *Cross-Program Auditor (CPA)*—examines and reports upon the characteristics of any number of input programs, across program boundaries, within the context of their functional interaction as a total system.
- *Extended Text Compositor (ETC)*—automates the preparation, composition, maintenance, and production of all forms of textual documentation.
- *Automated System Charter (ASC)*—automatically generates high-level system charts and reports, thus producing a panorama of job flow throughout an entire system. (This option will be available in mid-1974.)

Advanced Development Assistance

With these new facilities, AUTOFLOW II qualifies as an advanced development tool which can substantially reduce programming time and EDP costs.

ADR training aids, comprehensive documentation, and continual maintenance make AUTOFLOW II an efficient, easily used, and well-supported EDP asset. Automated error-reporting and distribution procedures expedite debugging and release of new product enhancements.

A variety of pricing plans (based on long-term, annual, or monthly charges) allows EDP management to select the most economical approach in furnishing AUTOFLOW II facilities tailored to an installation's unique requirements.

Versatile New Aid Analyzes Entire System Activity

PRINCETON, N.J.—A facility for the complete analysis of programs within an entire system further extends AUTOFLOW II's versatility.

This capability is provided by the new Cross-Program Auditor (CPA) option which permits integrated analysis of groups of program modules. CPA-generated reports can decrease the time and cost required to support applications systems, as well as increase the reliability of applications in a production status.

CPA reflects the latest advances in extending user control over ongoing system activity by providing analytical information on program inter-relationships and file organization.

Wide-Ranging Usefulness

By generating valuable analytical reports, CPA is a versatile program development aid with wide-ranging usefulness. CPA can simplify all maintenance activities, assist the data base administrator, forecast the scope of planned conversions and enhancements, monitor conformance to standards, and help in programmer training. CPA reports can also help meet the needs of auditors (either external or internal) by presenting comprehensive, highly structured reports of the often complicated interaction of programs within a system. Further, an auditor can selectively search for those names, structures, locations, etc., which are particularly relevant to the specific purpose of the audit.

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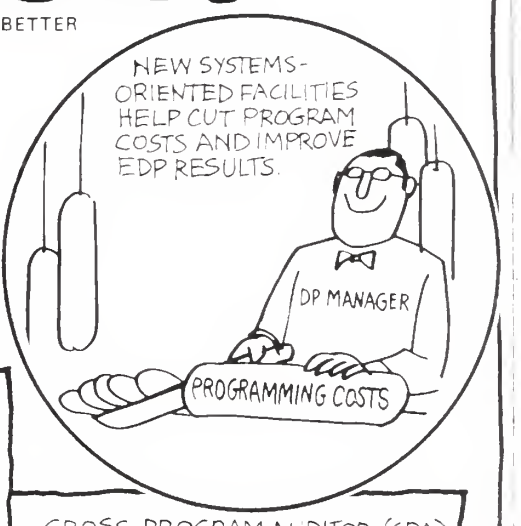

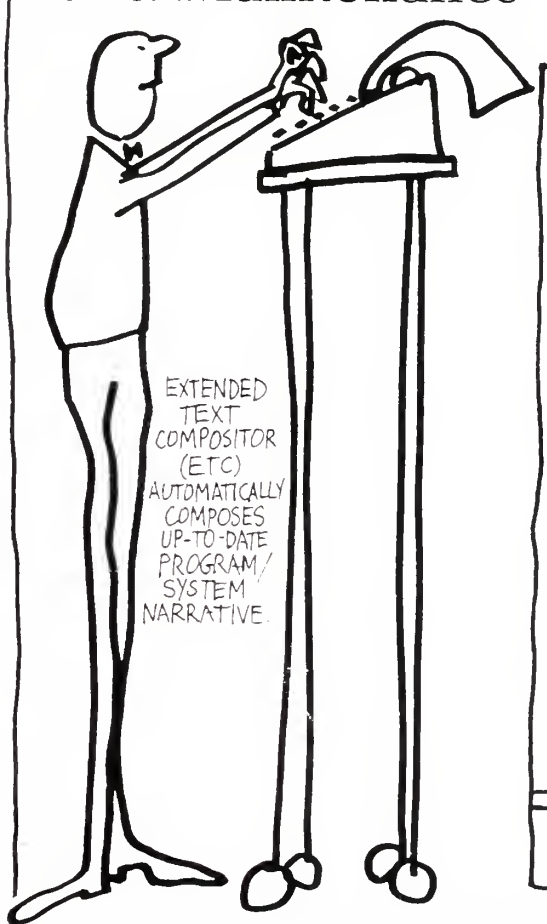

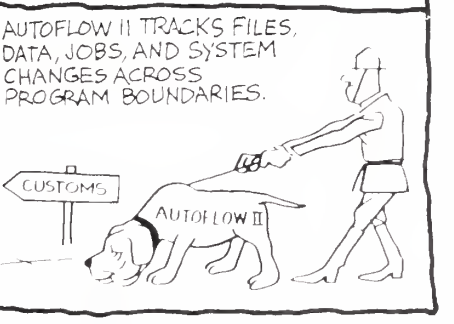

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Automated Text Composition with AutoFlow II

PRINCETON, N.J.—Automatic preparation and production of constantly changing narrative material—ranging from design specifications to policy manuals, internal documents, and final documentation for a project—are now available with AUTOFLOW II.

A new word processing option—The Extended Text Compositor (ETC)—dynamically extends AUTOFLOW II's graphic and narrative communication facilities. ETC simplifies the production and maintenance of all types of textual documentation.

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ETC relieves the user of many common problems associated with documentation production. It allows preparation of a continuous data stream which will be composed automatically to produce pages of formatted text on a high-speed printer. Thus, all systems specifications and other narratives can be made available in hardcopy form when needed. Further, even when specifications change, all supporting documentation can be easily and immediately revised via convenient ETC updating commands.

The new word processing option handles line editing, line overflow, justification, and the proper dating of documents. ETC also provides an automatic table of contents facility and a comprehensive index generation capability. Through a facility analogous to the macro capability in Assembly languages, ETC can eliminate much repetitious data entry. ETC also enables entire sections of text to be conditionally included or omitted in the printed document.

Users Investigating Alternatives

Costs Soaring as East Coast Feels DP Paper Pinch

By Toni Wiseman
Of the CW Staff

Even in areas unaffected by the strikes in West Coast paper mills, paper shortages are becoming an everyday problem.

While Pilot Life Insurance Co., Greensboro, N.C., is not having undue difficulties in getting a sufficient supply, deliveries on some stock are later than usual, according to David P. Winstead, manager of DP technical services.

And the cost has gone up in excess of 20% on some items, he said specifically on multiple-part forms.

The high cost of carbons has affected other users as well, with various solutions being applied to counterattack the problem.

Pilot Life has been looking at microfiche, Winstead said, as well as duplicators such as the Xerox printeed machine which reduces stock paper to 8-1/2 in. by 11-in. and can be equipped with an overlay to produce form images. "This is saving us both carbon and paper," he said.

Glenn Millar, DP manager at Jackson Manufacturing Co., Harrisburg, Pa., is also having trouble getting carbon-type paper.

As a result, he said, the company has just finished an extensive study to determine who gets which reports, and whether they really need or want them an effort which he projects should realize a 30% paper saving.

The company is just about to negotiate a new paper order, Millar said, and while he got in a final order at last year's prices a few months ago, he is sure "we're going to really feel the rise in cost with the next box that comes through the door."

"In some cases we've been cut back to 90% of what we were using last year, mostly on the 14 in. by 11 in. one-part stock paper," James Miller, manager of computer operations, Black & Decker Manufacturing, Towson, Md., said.

Miller said where the company used to sign a one-year contract for paper supplies, it now has to contract on a month-to-month basis. "That way they can increase the price more often," he said.

'If You Can Pay . . .'

Along the same lines, Miller said he has had to order stock forms with the company's name printed on them. "That way they're providing you with an extra service and can charge more for the supplies," he said. "If you're willing to pay, you can get all the paper you want."

Black & Decker is taking a serious look at computer output microfilm (COM) to fight the rising cost of paper, Miller said. In fact, two reports are already being produced on microfiche, cutting down by 2,400 4-plies a month, he said.

The company is currently using a service bureau for the COM application, but may bring the work in-house when more reports are added. "At this point, it costs us less to use the service than to buy the paper we'd need to print," Miller stated.

Specialty forms is also a rising item, according to Leonard Kessler, Book of the Month Club, Mechanicsburg, Pa.

"The shortage of stock forms has not been too bad for us, we can get what we need," he said. "Our problem is our use of scanning equipment. The paper used in turnaround documents is really short."

Whereas delivery was four to six weeks a year ago, the lead time has lengthened to at least eight weeks, and in some cases 12, Kessler said.

"And it's not the standard paper we're used to either, quality-wise," he noted. "The printing ink may be either absorbed more or less than before, printing shadowing is affected and the weight of the paper is different. Consequently our scanner reject rate is much higher."

The price on scanner paper has increased more drastically than in other areas, Kessler averred, having risen 40% to 50% in the last 12 months.

"Our vendor asked us for a ballpark figure on how much paper we thought we'd need for the 1974 year," Kessler said, "and based on our estimate we went to the mills and ordered accordingly.

"I think this has helped us somewhat," he said, but was still not optimistic for the future paper outlook.

Winstead is not depending on his vendor for forethought; he readily admits he is stockpiling, "even though suppliers tell us we'll be able to get all we need."

Strike Ends But Supplies Still Short

BOISE, Idaho – The four-week paper mill strike that threatened to curtail some computer operations in the West has been settled, but computer users still face continuing short supplies.

Workers at four West Coast mills of the Boise Cascade Corp. here ratified a contract settlement June 1 and returned to work the next day, a Boise spokesman said.

Boise is a major supplier of newsprint and business forms papers, and two of the struck mills were heavy produeers of business forms papers.

Supplies of computer printout paper will remain short, sourees in the business forms industry said.

"We'll still be in trouble for months," one supplier said, adding, "8,000 tons of paper are gone forever."

He said there will be shortages of certain kinds of paper, and users may have to use substitutes and make do with what they ean get.

Meanwhile, paper makers announced a new increase in paper priees. The increases range from 15% to 35%, effective in July.

Decus Panel Sees Ideal Mini as Interchangeable Unit

Continued from Page 1

tive use. Bell warned. Up to this point the main thrust in minicomputer design has been to use the emerging technology to build a smaller, more compact copy of some of the original computers at a lower price.

Minis are slowing taking on all the attributes of larger machines – more data types, larger memories, more peripherals, multiprogramming – as long as they don't violate some basic cost constraints, he noted.

Bell traced the drop in mini prices over the last seven years at 37% compounded a year.

Commenting on the presently ongoing controversy to define the differences between a minicomputer and a microcomputer, Hopper tossed in another definition: A mini is like a Univac I – 1K 12-character words and 10 I/O ports.

But "we have completely forgotten what we can do with a machine of that size dedicated to an application," she said.

She therefore called for dedicated systems without complicated operating systems, without complicated general-purpose I/O, but with the capability to have instructions and data in independent storage units for data security.

Hopper advocated a three-address code because it long ago had been proven the "most economical for data processing." But probably of greatest importance, Hopper wants the mini of the future to be modularized so applications can be run on a number of systems.

"If I have a great big file there should be nothing to stop me from breaking it into segments, each to be handled by a small system," she said. This philosophy, however, calls for good systems analysts who can define how an application will be organized.

Mini hardware is not as much a problem as software, systems design and the handling of data, she added.

Two main things Hopper wants to see in hardware are a 12-character word, and throw-away modules and fault identification procedures so anyone can fix a mini. Mini equipment is priced low enough so that there is no need to "twiddle with bits" in an attempt to save memory, she said.

Tartar described the ideal mini, at least for the college environment. It should utilize a variety of I/O devices to construct architecturally any type of machine a user could desire.

Tartar proposed "a standard basic machine similar in some respects to an automobile in which a variety of components built by various manufacturers can be connected to the device.

"If the CPU is the heart of standard computers, I/O is the soul of minicomputers and the minicomputer's reason for being is to be useful to the outside world," he said.

But I/O effectiveness, he cautioned, is tied directly to the creation of a standard form modifiable for each I/O device with a very minimum of interface.

Software written for one vendor's mini should be usable on other machines, he added. "To do this, emulation through microprogramming is highly desirable as the solution to program compatibility," he said.

Another feature Tartar would like is the ability to add to a 16-bit machine an option to make the machine have an 18-bit, 32-bit or 64-bit structure so the memory bus instructions could be added when needed.

While David agreed with all the concepts put forth by Tartar, he added a few select characteristics he thought were necessary.

An instruction he misses on minis, for example, is the Execute, which enables the programmer to call for the execution of a particular instruction. Another area he feels could use improvement is memory – it must have the capability to be very big if and when it's needed, and addressable without wasting extra address bits.

When a mini goes down, David said, it must also be able to come up quickly. There should be something in the mini so a malfunction can be exactly diagnosed, and the mini should be designed so the problem can easily be repaired.

Although the Unibus-like structure seems to work pretty well in the ability to interface with a number of I/O devices, David said, the common bus tends to choke the machine during high-speed I/O operations.

He suggested a somewhat older architecture whereby each memory module would have a direct access channel into it. Communications capability is becoming more and more important, and David desires improvement in the ability to interface minis with other computers and network environments.

A code conversation box that automatically converts to Ascii when needed – possibly even in the control memory – would also help, he noted.

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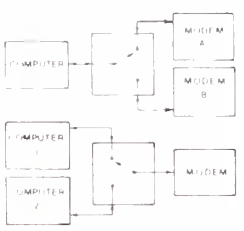

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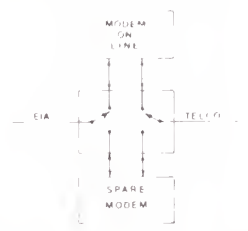

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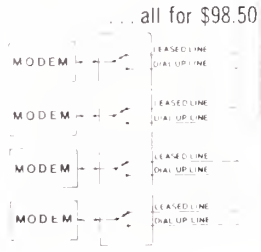

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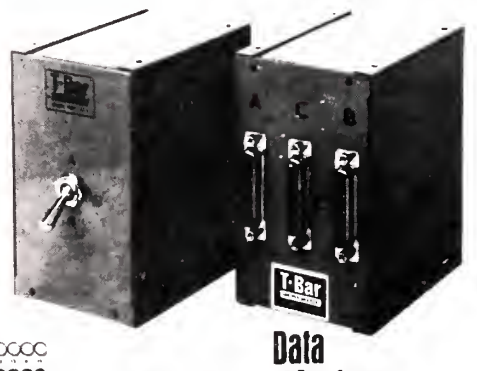

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CPE Office to Aid Nongovernment Users

(Continued from Page 1)

procurement process and how it will support other agencies has been started, according to Dennis Blaeuer, a member of GSA Commissioner Shy Meeker's staff.

The person who will head the office has a long history of CPE work and "great enthusiasm" for the improved effectiveness that intelligent monitoring and evaluation and implementation of indicated changes can bring to a DP site. Although the GSA staffer named the person, he asked that it not be divulged until the press release authorization process had been completed.

GSA expects the new operation to start slowly over the summer, but come on strong in the autumn with a series of meetings during which the government body hopes to establish "a formalized dialog with industry" on general management and specific DP topics.

The current GSA staff has "tried to keep up with the state-of-the-art in data processing, but has perhaps lost track of modern management techniques by not dealing with industry enough," Meeker's assistant admitted.

Starting in September, the agency wants to make amends for this past neglect. Starting with several large, open meetings "with plenty of publicity ahead of time," GSA wants to tell industry what it is doing, what trends it is following not only in procurement but in day-to-day operations and management as well.

Explore Common Problems

"From those discussions, we expect first to excite some interest in an exchange of views — both ways — and secondarily to encourage a lot of spin-off conversations" that will get down to detailed swapping of ideas, Blaeuer said. The large meetings should help set the stage, showing what problems are common to both government and industry, he explained further.

Certainly, he said, many DP applications are generally similar whether in or out of government, and equipment configurations are comparable. Therefore the CPE guidelines put out for government agencies should provide support for "civilian" installations as well, he said.

By Jan. 1 next year the new CPE office should have also completed its coordination with other agencies and be ready to implement several aspects of its regulatory/supportive effort.

Some specifications on how CPE fits into the procurement process for new equipment should be ready by then. More importantly, however, in the view of the GSA staffer, will be an ability to answer agencies when they ask for help in working with the specifications.

"We have to be ready for the challenge 'Sure, GSA, you're telling us one more thing to do. How are you going to help us with it?'," he said.

Part of GSA's effort, Blaeuer went on, is to raise the level of DP and teleprocessing management. "The stuff we get in trouble with now is nickel and dime stuff. We're trying to get away from that and raise the level and, some say, 'the dignity of management.'"

Bill Would Allow All Interconnection

(Continued from Page 1)

or device not furnished by a telephone company" subject to standards prescribed by the FCC. In addition, "no telephone company may prohibit directly or indirectly the attachment or connection" of equipment which meets the FCC standards.

Under the bill, violations by individuals or phone companies would be subject to fines of $1,000/day. And if enacted into law, the FCC would be required to prescribe standards within 180 days.

In introducing the bill, Podell also chided the FCC saying "the commission has failed to establish overall guidelines on the validity claims" relating to harm caused by noncarrier equipment. In cases where validity of the AT&T claims have come up, interfacing requirements imposed by the phone company "have been found to be illegal," he said.

"At this very moment AT&T is collecting thousands of dollars in unearned profits from consumers who decided to go with" noncarrier equipment and "this practice must be stopped now," Podell said.

"It is imperative that we act swiftly to stop big business from running roughshod over the American people," he concluded.

The bill will be heard by the Communications Subcommittee of the House Committee on Interstate and Foreign Commerce. The subcommittee is chaired by Rep. Torbert Macdonald (D-Mass.) but no date has been set for a hearing on the bill, a spokesman said.

The FCC staff is currently evaluating Podell's legislative proposal and it will probably issue a statement at a later date, according to a staff source.

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Canadian Study Warns

Data Retrieval May Be Hazardous to Legal Health

Special to Computerworld

OTTAWA, Ont. – Electronic data retrieval applied to the field of law could distort legal thinking, adversely affect the concept of precedent and the lawmaking ability of judges, and enhance existing social inequalities, according to a study prepared for Canada's Department of Communications.

Conducted by Philip Slayton, a professor at McGill University in Montreal, the study was commissioned by the department to examine the potential impact of computerization on the body of knowledge and the structures that have traditionally served the professions. Slayton selected law as a model of the classical professions.

Not How Lawyers Think

Electronic legal retrieval systems have been developed with little regard for how lawyers actually think, according to the study, and to the extent they reflect a lawyer's thought processes, they may do so accidentally. In addition, retrieval systems may impose certain alien logical structures on the verbal symbols of law and thereby affect legal thought and "ultimately, substantive law."

"Preliminary investigation suggests [data retrieval systems'] contribution to the legal profession is slight and, quite possibly, their effects are decidedly unfavorable."

Slayton also discovered retrieval systems cannot operate by way of analogy, a key feature of legal thought. Neither can they be used to retrieve legal concepts satisfactorily.

He concluded retrieval systems may destroy the ability of judges to make law by imposing a myriad of specific rules and by filling legal lacunae.

Finally, "retrieval systems may accentuate existing social inequalities by providing superior legal information for large law firms and government agencies at the expense of small firms and solo practitioners who normally represent weak clients," he commented.

These findings indicated to Slayton that "large resources, whether human, financial or whatever, should not be devoted to the maintenance or development of electronic legal retrieval systems of the existing type without further extensive study."

Present systems "have not been developed with full regard to their implications," he said. "Preliminary investigation suggests their contribution to the legal profession is slight and, quite possibly, their effects are decidedly unfavorable." Slayton also noted that even the legal information problem they were originally constructed to solve may not really exist.

"What is needed is a pause in funding and development," he commented. He suggested emphasis be placed on a serious evaluation of electronic legal retrieval with four major objectives:

- Research into the nature of legal thought processes.
- Careful experimentation with operating retrieval systems to determine their exact capabilities and to compare their results with those of manual searching.
- Careful juxtaposition of conclusions concerning thought processes with the constraints imposed by, and the results of, electronic retrieval.
- A call for experimentation with advanced artificial intelligence systems, such as the McCarthy "Taxman" project, to determine whether, and in what respect, they constitute a line of development more worthy of pursuit than the development of established retrieval systems.

Slayton's study provides a framework for evaluation along these lines.

Find Public Interest

In addition, the report contends that before government funding of electronic legal retrieval systems is continued, a public interest in their promotion must be identified.

Slayton asked if existing or developing systems work and their general impact is benevolent, what justifies support from public funds, rather than from commercial resources? But if existing and developing systems do not work, or work but have a deleterious effect, reasons must be identified for government support of experimentation, Slayton said. "Promiscuous spending of public funds should not be permitted," he concluded.

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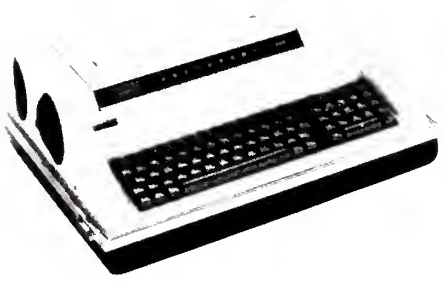

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Computer Collecting Data On Effect of Nuclear Plants

ROCKVILLE, Md. – Researchers here are using a computer to collect meteorological data at six prospective sites for nuclear power plants east of the Mississippi.

The Atomic Energy Commission requires that a power company proposing construction of a nuclear plant must collect meteorological information at the site for at least two years, prior to groundbreaking, during construction and for at least two years after the plant goes into operation.

Environmental Impact

The meteorological information is used in forecasting the environmental effects of the plant. For example, if the plant uses cooling towers, scientsits can use the data to predict whether the artificial fog produced by water evaporating from the towers will reduce significantly the amount of sunlight falling on the surrounding countryside.

Or, if the plant uses a seawater cooling pond, local agricultural authorities will want to know how much salt spray will enter the air and how it will disperse.

Digital Graphics, Inc. (DGI) is using a variety of Varian equipment, including a Varian 620/L minicomputer, to record analog signals at 10-second intervals which are then transmitted to a Varian 73 mini for processing. Thirty-two different analog signals are monitored, including rainfall, wind speed, temperature, wind direction and radiation.

Based on the collected data, DGI constructs mathematical models to determine what the effects would be should an accident occur, for instance, where the fallout would be.

After a plant is constructed, a DGI spokesman said, a model of actual conditions will be compared with the calculated model so that more precise accident data can be obtained.

Received No Marketable Skills

DP School Investigation Charges Foreigners Illegally Solicited

By Patrick Ward
Of the CW Staff

BOSTON – Foreign students illegally brought into this country to study DP at a for-profit career school here got little of the training they expected and were left with practically no marketable skills, the *Boston Globe*'s "Spotlight team" has charged.

The *Globe* ran a four-month investigation of for-profit vocational schools in the Boston area, and in a previous article criticized the Boston branch of the nationwide Electronic Computer Programming Institute for misrepresenting the training it offers [CW, April 17].

In the latest charge, the *Globe* claimed the director of the Andover Institute of Business of Boston issued "special student immigration forms under the name of a defunct computer school whose 'approval' to issue the required documents has been terminated by the U.S. immigration service.

"The foreign students, who have comprised almost half of the school's student body, are solicited from as far away as Korea, Taiwan and numerous Caribbean islands with promises of expert computer training and well-paying jobs after graduation," the newspaper noted.

The students were to receive most of their instruction by listening to tape recordings in English, rather than through hands-on experience, the newspaper said, and the foreign students found this approach especially inadequate.

The *Globe* charged Barry S. Gersh, director of the school, accepted "foreign youths without judging whether they had sufficient scholastic preparation to take computer courses."

Additionally, the newspaper said, the school took on foreign students who had "little or no understanding of the English language and [Gersh] provided them with no compensatory instruction, a policy that crippled the learning capacity of most."

The *Globe* emphasized that the local school is not connected with any other school carrying the Andover Institute of Business name.

The *Globe* stated the school got some help in recruiting local youths from Boston School Committee Chairman John J. Kerrigan, who has about $1,600 invested in Computer Educational Services, parent corporation of the Boston school, and is a member of the firm's seven-man board of directors.

Kerrigan furnished the school with lists of Boston high school seniors, the newspaper charged, leading to a two-year bombardment of "Boston youths with literature about the computer school."

Gersh said Kerrigan's office had twice furnished the lists, an illegal action, but when the Spotlight team asked Kerrigan this question, he replied, "I'm not sure if I did or not."

Gersh told the *Globe* no foreign students with problems understanding or speaking English were ever accepted in the school, but he "was able to provide no documentation."

"Learning computers was difficult enough, but when they had a language barrier it was just about impossible. I don't know how any of them could get jobs," a former instructor said.

The school's former placement officer said about half the keypunch graduates and one in 10 of the programming graduates found related jobs, according to the *Globe* story.

Placement statistics were worse for the foreign students, he said. Immigration law prevented them from finding permanent work in the U.S., and the former placement officer said he "never placed a foreign graduate in a job in his native country."

What Do I Hear for 30 Lbs of Jelly Beans?

BOSTON – Once a year WGBH, the educational television station here, runs an auction in which staff members and local personalities hawk everything from paintings to 30-pound bags of jelly beans to helicopter rides to autographed hockey sticks.

While the phone calls pour in with bids for the donated items, and the cameras scan the hectic goings-on, an IBM System/3 keeps track of the inventory of goods, who bought them and at what price.

And each hour the computer prints out how much money has been raised so the master of ceremonies can read the figure out to the television audience.

In the weeks before the auction starts, the station's own staff keypunches in an inventory of donated goods.

As the pace picks up, volunteer keypunchers, working four shifts a day, come in to help enter inventory and "confirmed bids" on the items.

When someone in the audience calls in with the highest bid on an item, his bid slip is matched with the original item description. More station volunteers confirm the bid by calling the bidder, and then the documents go to keypunching.

The computer not only prints out to whom the item was sold and for how much, but other information valuable to the show's producers, according to Dorothy Keith, a volunteer at last week's auction.

The printout points out mistakes such as entering an incorrect number, or referencing an item already sold, she mentioned.

"This year it's running very smoothly; so far we have no problems whatsoever," she said.

Once the auction is over, Keith said, the System/3 reverts to its task of handling payroll and other station business.

Federal Control Hit For Aussie Law Bank

Special to Computerworld

SYDNEY, Australia – The Australian Government should not have control over a proposed computer bank of Australian legal information, a New South Wales Supreme Court attorney told the Australian Computer Conference.

J.N. Creer said the legal profession and state governments should be protected against possible Federal Government interference with the computer bank.

The computer bank was recommended last month by the committee on computerization of legal data.

The bank would give lawyers and judges almost instant access to all Australian case histories and legislation.

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NCR User Group Told

Health Field Faces Regulation

CINCINNATI — DP people in the field of health care must enlarge their viewpoints to include not only a technological but a regulatory environment, specifically, the growing impact of Professional Standards Review Organizations (PSRO).

This was the message presented to some 75 health care professionals here at a Federation of NCR Users meeting by Glenn Anderson, director of the Hospital Systems Management Division of the American Hospital Association.

"PSRO is intended to monitor health care institutions to insure that proper services and quality care are provided," Anderson said. "[But] data processing people can see a tremendous information reporting requirement here and therefore immediately assumed that PSRO presents a tremendous challenge." [CW, April 17]

The government is now working on definitions of PSRO data requirements, Anderson stated. But these will only be minimum requirements. Specific requirements will still be worked out by each of the 203 PSROs throughout the country with the result that implementation of requirements will be a local problem to which DP people must individually relate in each PSRO region.

"Very soon, deliberations will be opened for outside input and there will be an opportunity for user groups to insist on getting definitions of PSRO data requirements," Anderson said. "Considering that there are 203 PSRO regions relating to 7,000 hospitals, there is a great potential for avoiding duplication and reducing costs through sharing."

However, Anderson pointed out that for appropriate and effective data processing between institutions and regions it will be necessary to have standardization. But standardization will be slow to come, he said, because, among other reasons, initial considerations will be medical and political rather than systems-oriented.

Cost Controls

"PSRO proposes quality review controls on medical services but, in effect, it provides cost containment controls," Anderson said. "It is a corollary to and successor of Phase 4 controls."

Under Section 223 of the law establishing PSROs entitled "Limitations on Coverage of Cost," "the government can and will take a look at the cost elements of care," Anderson stated.

"The government will estimate what would have been a reasonable cost for benefits provided and reimburse only for this. And one area that not only government but third-party insurers believe is out-of-line is DP costs.

"Therefore, it will be very important for DP to cost-benefit everything that is done," Anderson said. "This is not a threat but a warning to avoid some very unpleasant situations."

A further complication is Section 221 entitled "External Review of Capital Expenditures," or Section 1123 of the Social Security law, according to Anderson.

Under this section, comprehensive health planning agencies will approve or disapprove capital projects exceeding $100,000 in cost. A DP installation involving lease payments of more than $100,000 will be reviewable under the section. Projects must

(Continued on Page 9)

Guides for Growing Systems

CINCINNATI — Guidelines for long-range systems development in the health care field were proposed here recently at a Federation of NCR Users meeting.

Robert Murrie of Florida Software Services, president of the Cooperative Health-Care User Group (Chug), led the meeting which was attended by nearly 75 representatives of health care facilities located throughout the country.

Among the projects proposed for systems development over the next two to five years were:

- A total, integrated system utilizing data collection facilities to provide complete control and maximum efficiency.
- Professional clinic billing, professional staffing and diagnostic assistance.
- Preventive maintenance.
- Pharmacy profiles.
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- Multiphasic screening related to requirements of professional standards review organizations.
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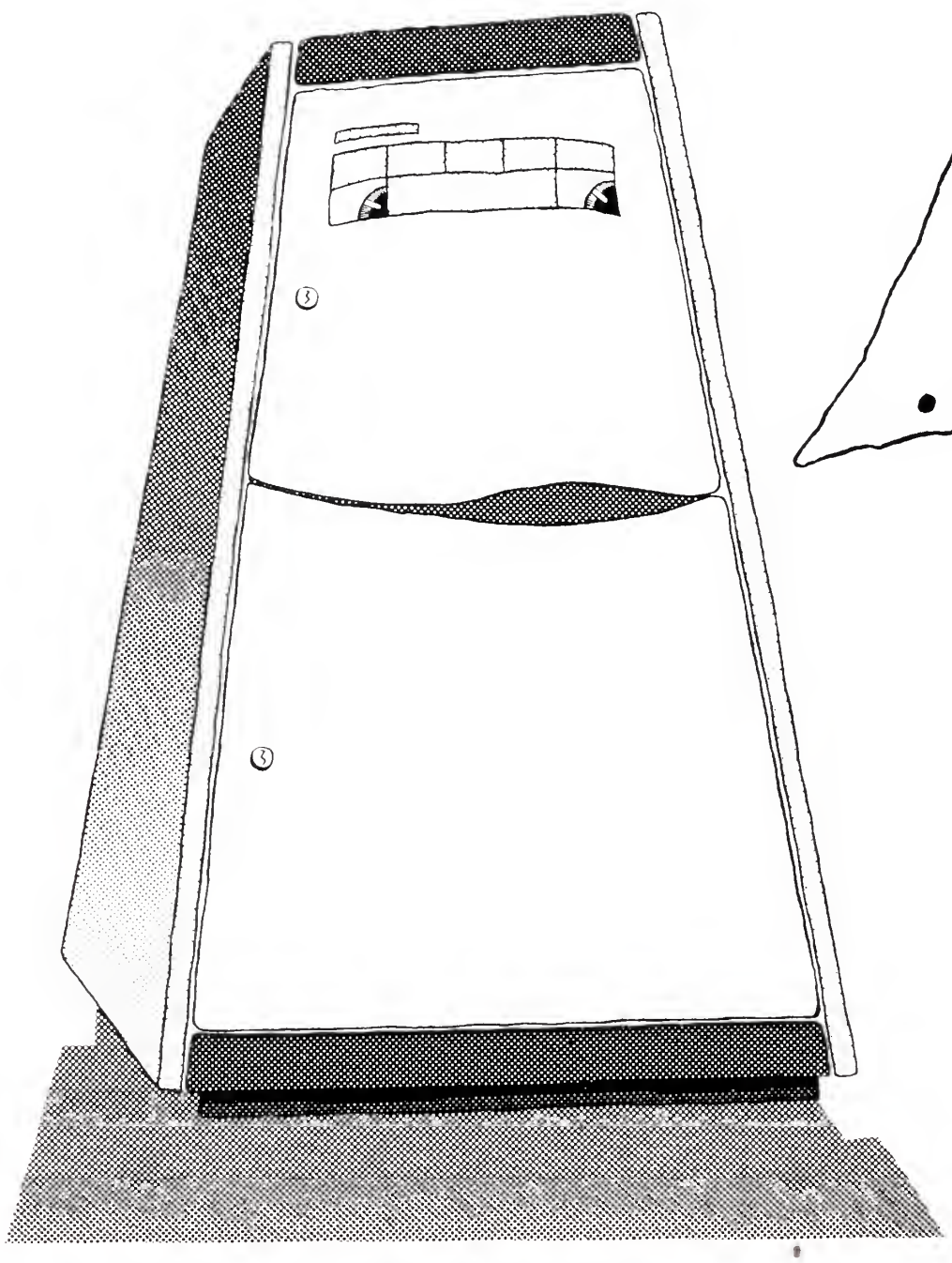

Slated for Minneapolis

DPMA Pleased With Prospects for Info/Expo 74

MINNEAPOLIS – "We see Minneapolis as being much more successful than Chicago was last year which, in turn, was more successful than New York," said Donn Sanford.

Sanford, executive director of the Data Processing Management Association (DPMA), said he was very pleased with prospects for Info/Expo 74, which will be held at the Minneapolis Auditorium and Convention Center, June 23-26.

A merger with Afips will not affect next year's conference, Sanford predicted.

"There has been no decision and little discussion on changing the format of the conference, except that it will probably be in the fall to avoid a conflict with NCC," he said, affirming that both the conference and the exhibits will continue.

"We're not trying to compete with NCC in terms of attendance or exhibits," he said, noting that DPMA expects some 1,400 to 1,800 attendees.

"The shows are aimed at two different markets," Sanford said. "You don't find top DP managers going to NCC, but you will see them at DPMA because the exhibits are more specifically business-oriented and they don't have to fight their way through the OEMs and so on."

Sanford noted that IBM has reserved 900 sq-ft of exhibit space, and Univac and NCR will both have large exhibits of mid-size computers.

The conference offers 23 program sessions in keeping with this year's theme "Stay on Top of Tomorrow."

[illegible] include "[illegible] memory, data entry systems, point-of-sale systems, minicomputers and managing the small- to medium-size data processing department.

'Personal Growth' Sessions

Eight "personal growth" sessions and nine "by request" sessions round out the three-day program.

Among the special sessions is a panel which will deal with data security from management's [illegible]

[illegible] DPMA [illegible] 505 Busse Highway, Park Ridge, Ill. 60068.

DP Must 'Serve' Hospital's Needs

CINCINNATI – "Data processing needs to expand its perspective so it can truly be a resource serving the hospital rather than a prime entity itself," Glenn Anderson, director of the Hospital Systems Management Division of The American Hospital Association, told a NCR user group meeting here.

"The technological viewpoint must be expanded to include the viewpoint of the hospital administrator.

"Many applications devised by DP are meant to serve the hospital but, in terms of the disciplines imposed on the hospital, the tail wags the dog," Anderson continued.

"In the future, what is needed is to work harder to make the computer fit the institution rather than the institution fit the computer."

Anderson pointed out that hospital cash flows are currently down, creating a capital shortage problem which will make it more difficult for DP to grow in the future.

"DP equipment must compete with medical equipment which has a demonstrable effect on medical care. As a result, administrative capital items such as DP hardware will have a problem," Anderson concluded.

Health Field Faces Wider Regulation

(Continued from Page 81)

be reported in advance and, if not approved, can be disallowed under Medicare.

"For the section to be effective, governors of each state must sign an agreement with the Department of Health, Education and Welfare," Anderson said. "The section is voluntary now but it probably won't be forever.

'Economy the Key'

"The biggest issue in the health care field today is economy," Anderson said. "All of the National Health Insurance bills which are most likely to be enacted include the cost controls discussed above. Third-party insurers are also insisting on them. And the controls include data processing hardware and software as well as other costs," he concluded.

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Editorials

Storm Warnings

It has long been an article of faith in the computer community that automation creates more jobs than it displaces.

Up to now, this faith has been fully justified as the computer revolution spawned whole new classes of jobs and professions from designer to programmer to systems analyst.

Today, however, there are storm warnings on the horizon which signal a possible change and it is time for everyone involved with computer systems to pause and think about the possible long-term effects their systems may have on the national work force.

Automation in factories throughout the land holds a great promise of freeing man from repetitive, back-breaking, dangerous and dirty tasks.

But by taking these jobs from the unskilled laborer, automation displaces those least likely to cope with the change: you just can't expect a minimally educated, unskilled laborer to become a programmer overnight.

And at the other end of the scale, the settlement between printers and publishers in New York City shows automation can displace many highly skilled workers, generally middle-aged who cannot be expected to begin a whole new career at that point in their lives.

Both businessmen and labor leaders are now grappling with the problems brought about by our technology.

Many would say those in the computer community should not have a voice in these discussions, asking only that we supply the equipment and skills to implement it and leave the social and political problems to others.

But no one understands the potentials – and potential problems – of computers better than those who work with them every day. *Your* input will be needed in this evolving debate.

It is not too late to examine the issues raised by ever-increasing automation, but it may be soon.

Conserving for the Future

Power and paper . . paper and power. Shortages in these two important commodities face computer users everywhere.

These shortages, which affect users' everyday operations, should make everyone increasingly aware of the fact that our national resources are not infinite.

Innovative users faced with shortages have begun to evaluate their applications with an eye toward conserving increasingly precious resources, particularly paper.

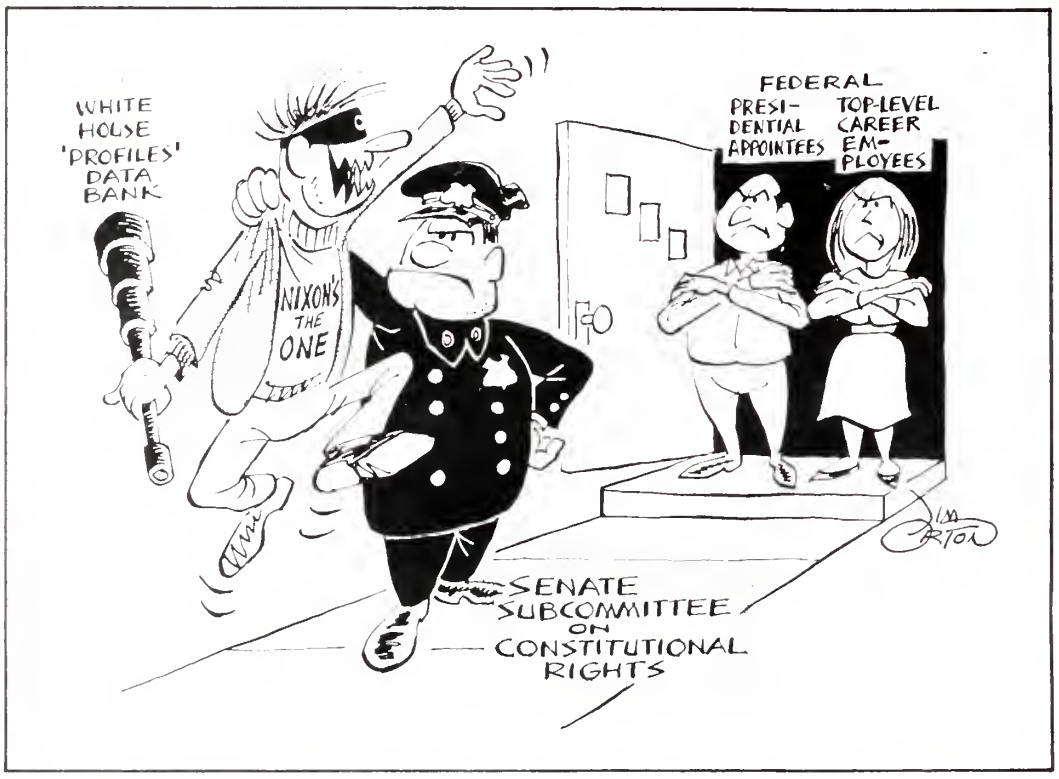
All users should follow their lead, regardless of whether the paper and power crises are particularly serious in their areas of operation.

If we all cut our paper and power consumption just a little – and we can – the total will be impressive.

We should continue these conservation programs even after these particular crises (strikes at paper plants and the increased power drain of the summer) are passed.

In fact, we should carry over the conservation measures we are forced to apply to our businesses into our everyday lives.

By reevaluating our wasteful habits – both in our professional and personal lives – we can, and must, conserve the resources that are important to all of us and will be even more dear to coming generations.



'Hi, Folks, I'm Your (uh) Friendly Neighborhood Peeping Tom'

Letters to the Editor

'Distributed' Programmer/Analyst Represents a Giant Step Backward

The argument for a "distributed" programmer/analyst by Frances Smyth in the May 29 issue seems to propose a giant step backwards.

In the early years of data processing the computer programmer was usually required to be the analyst, directly interfacing with user areas. The colossal communications failure in the 60s led to the emergence of the data processing systems analyst as a necessary link between user and programmer.

A major benefit from this division of project responsibility is the requirement for good written system specifications. Smyth lists as an advantage the elimination of the communication problem between analyst and programmer; certainly this would be an advantage if the original programmer/analyst were always available and had total recall. Under any other circumstances, future modifications will be difficult, if not impossible.

I agree that everything possible should be done to give the programmer a better perspective of the job he is doing. I believe the analyst can help by providing in his specifications to the programmer at least a good overview of each job, and by bringing the programmer into delivery of the job when completed, whenever possible.

Isolation from other company areas and from top management must be avoided for data processing personnel, just as it must be avoided for bookkeepers, salesmen, switchboard operators and mailroom people. But this can be and must be accomplished in some more efficient manner than the lumping together of separate (even if interfacing) disciplines.

Larry N. Walters
Systems Coordinator

Empire General Corp.
Los Angeles, Calif.

Programming, Systems Distinct Jobs

Maybe we haven't learned from such recent cases as Equity Funding and others that one can't possibly have security if the systems project leader is also the programmer ["Combining Analysis, Programming Work May Ease Staff Tensions, Help Users," CW, May 22].

The user departments may not get objectivity, because the programmer has a vested interest in how easy it will be to program the application.

Many programmers, because of the technical nature of their jobs, have no training or understanding of manual procedures. Therefore, there is a communications gap with user departments which *must* be filled by the systems person.

I have grown up through the ranks of data processing, working in operations, programming and systems. But the programmer *has* had a choice. He could move up on the technical or engineering side of systems or he could move up on the planning and methods side of systems.

If he chose the latter (I did) he would no longer be involved in programming of applications. I never considered programmers as clerks, nor looked down on anyone wishing to remain a programmer for life. It is a highly specialized and needed position in society.

I wouldn't care to have history turn around and require me to start programming again. I enjoy my work very much and systems people with management training and skills are needed to fill the information gap.

There is a place for all of us with our own special skills. I hope we will all continue to move forward toward an improved data processing profession.

S.A. Rummage
Systems Analyst

Ferris State College
Big Rapids, Mich.

What's Good for the Voters...

I found it hard to believe that Herb Grosch's "Letter to Honeywell" [CW, April 24] was serious in suggesting:

- That any of the U.S. computer manufacturers should withhold their products from the Pentagon because of the use intended to be made of them. The Pentagon is a government department responsible to the government the American people elected and put into power, carrying out policies presumably accepted by the majority of Americans. If they are not doing so, the answer is obvious. Grosch has a vote; Honeywell, Inc. does not.

The presumption must be that the majority of Americans are prepared to support what Grosch is not. If the majority of Americans is wrong, attack the problem at its roots, not at its symptoms.

- That IBM (or any other manufacturer) is more "humane, ethical, concerned" than Honeywell. IBM lost the Wimmix contract; does Grosch really believe had IBM won it, the firm would have declined to pocket the contract on grounds of "humanity, ethics and concern?"

L.V. Glavina

Vancouver, B.C.

Let's Give Credit Where Due

Re "All Systems Go as Students Recycle Surplus Minicomputers" [CW, May 22]:

The article was based on my recent letter sent to *Computerworld* with a copy of the paper authored by myself and Dr. Richard Gonzales, professor of engineering and dean-designate of the School of Basic and Applied Science. Without his interest and, in particular, his hardware expertise, the D17B recycling would have been impossible at Purdue Calumet.

A.V. Dundzila
Manager
Data Systems and Services

Purdue University
Hammond, Ind.

(Other letters and viewpoints on Pages 11 and 12.)

What's Wrong With Aiding The Defense of America?

By G.F. Herndon
Special to Computerworld

I have always had a feeling of sympathy for people afflicted with three forenames, due to the many burdens visited on these poor creatures. Apparently, these burdens have overwhelmed H.R.J. Grosch and his good sense has taken flight.

I refer to his letter to the chairman of the board of Honeywell, Inc. which appeared in the April 24 issue of *Computerworld*, in which he irrationally pleaded for

Reaction

the acceptance of proposals made by some group, unheard-of except in the most left-leaning circles. These proposals had to do with Honeywell disengaging from its military production efforts.

Why is it wrong for any company to assist in the defense of America? What if Honeywell did, in fact, stop its military production? Would that be of aid to America? What if (as the Grosches would have) all companies were at once to cease their military production? Would that be beneficial to America? I'm sure such steps would be highly applauded by our (non) enemies!

The scorn which liberals are prone to heap on those not in agreement with their myopic views is all too apparent in Grosch's penultimate paragraph. His reference to Honeywell's popularity with the Pentagon as opposed to its supposed unpopularity in the market among "human beings" is, to be charitable, offensive. For his information, the Pentagon is a rather large five-sided building unable to do anything except succumb to the ravages of time and the elements.

However, inside this structure can be found thousands of dedicated Americans (and a few rotten apples) interested in America's defense, interested in maintaining our freedom and concerned about our enemies. Presumably, these Americans are also human beings, not the monsters suggested by the deluded Grosches America must suffer.

For my part, "Thank you very much" people in the Pentagon, Honeywell and all other companies and groups who can and do serve America.

As for Grosch's last paragraph, it is an exercise in asininity. Particularly the "Honeywell would feel better" assertion. Bologna! It would lose a valuable source of income, the enmity of concerned Americans and Honeywell's management would lose its self-respect – knowing it kowtowed to a group of unforgivably naive citizens. In truth, only the Grosches of America and sundry overseas associates would garner any satisfaction whatsoever!

G.F. Herndon is DP manager for Bristol Steel and Iron Works, Bristol, Va.

Sydney

Imagine flying from Boston to San Francisco, not being allowed to get off the plane while it was refueled, flying back to O'Hare, stretching your legs for an hour, reboarding the same plane, going on to New York, again not deplaning, and then flying nonstop to Seattle? That's London-Sydney, 26 hours seat time plus nine hours clock difference. Coooo! I flew Thai Airways, with Thai cabin attendants and a mixture of Thai and Danish on the bridge. Caviar, purple orchids, purple fans, purple eyeplugs, but not as much booze as most intercontinentals. And no movies.

Sydney is lovely at this time of year. The hibiscus is still flowering in the Botanic Gardens, the sky is blue, the ski chalets in the Kosciusko Range haven't opened yet. The Southern Cross is still upstairs.

I came here before, in 1960, to chair a session at the first Australian computer meeting. Since then, the Australian Computer Society has been formed and along with the usual academic/publications jazz puts on a lively biennial conference. Number Six convened here at the magnificent new Opera House May 20. Heinz Zemanek flew in from Austria, Illinois and New Zealand to give Hip benison, Ike Auerbach gave the featured address in the grand hall of the Opera, and I did a panel on manpower problems at the opening session. We looked around for Aunt Grace, but it turned out she'd been here one or two meetings ago. Natch! I'm also going to Canberra to speak at the National University and meet some of my OECD acquaintances. There were at last count 13 countries on the program and at the Lord Mayor's reception (turns out his firm makes computer flooring!), remarkable in view of the distances in the Pacific.

The attendance is about the same as at Brunel last week, the exhibits much smaller – as in England, no ICL, although they used to be Number Two here. The papers are not as advanced but sound more honest than NCC. The lecture theaters – sorry, theatres – at the University of New South Wales are wonderful, and put the messy British quarters to shame. But the Brunel chef – him, they can't equal!

In computers as in everything else, it's a quiet and remote scene. All our problems are replicated, from hung elections and IBM dominance to really ugly ones like racial intolerance. But they are muted; they seem less pressing against the easy outdoor life and the beer-drinking *bonhomie* of today's Australia.

As in "On the Beach," though, doom comes from the north! The papers are discussing a plan for a $4 billion (those are $1.50 dollars) in freeways; television and radio are full of crap; and the schools are plugging Japanese. Time for a Computer Caravan? I think so.

Herb Grosch

Who's Really Responsible?

Upcoming Court Cases to Establish Selling Principles

The accuracy of DP proposals and general selling ethics have been a concern of mine for many years. It must be admitted, however, that few people in the industry have agreed with my contention that these areas should be cleaned up. Generally, people argue that the customer who believes the salesman is a fool anyway and deserves all he gets.

There is some legal support for such a position, and in the absence of some sign that there was anything important involved I have not pursued the matter. (An exception was the 1973 "Bait and Wait" series of Taylor Reports about who is responsible when the proposal is broken.)

However, I have to go back to the matter now because there are signs that something important is happening – right in the area which was most vocal about being baited and waited – the small, first-time user who does not have any real understanding of DP problems.

In the last few months, a number of such installations have given up negotiating with the machine vendors – and instead have started taking them to court. Angler's, whose Honeywell proposal was illustrated in the 1973 series, was the first I heard of back in January. Another came in last month from Fort Worth, Texas, where Leaon Johnson Supply Co. filed for $700,000.

From California came news of another. And these are only the ones I hear of. Only a few, but in legal land a single case is all that is needed to have principles decided.

The important item in these cases is that they are questioning whether the industry argument that a customer is a food to believe a salesman is really always valid. For instance, when a vendor is selling to a customer who he *knows* does not have the information to really make an informed decision, is there a higher standard of honesty in selling needed than in cases where the buyer is technically qualified? It seems there is and the failure of some vendors to observe this in the small user cases is why the recent cases are reaching the courts.

The Taylor Report
By
Alan Taylor, CDP

It is quite a question, because it can affect many of the ordinary computer contracts as well as the small system ones which seem to be the leading edge at the moment.

Take, for instance, the case in which a vendor has trained the DP sales staff, which then recommends to its employer the vendor's equipment, contract, etc. Let us assume that in the training the programmers are told certain parts of the operating system or the hardware are matters "over which they need have no concern," or that the staff is denied accurate, complete information.

This can happen at any level DP system. Indeed, with the controlled information flow, it probably happens with most vendors.

Assume there is then a failure of some sort which could have been avoided with greater understanding. Is the computer vendor going to find that, since he claimed the programmers and staff did not need more information, he is liable for the consequences?

The principles which limit his information practices may well be laid down in these small computer cases. So also may the principles regarding user-staff evaluations by vendors. The one term that appears to be constantly used to qualify the promises for successful implementation of systems in these small computer cases is that the installation success "depends upon the cooperation of the buyers' employees." Later it is sometimes argued that this cooperation has not been present, so the fault was related to the employees' conduct.

This is a familiar cry at all computer levels. If your staff recommends computer X, then manufacturer X says it is a fine group. If it doesn't, the vendor claims it is incompetent. A very effective gambit, but one which I personally dislike, because it can be used to hurt people's careers. But one which so far has not been limited effectively by our professional societies.

So if the law acts in the small computer cases to set up some principles, we can expect some changes in all cases.

It is a pity we have had to wait so long for some principles to be laid down – and that our profession itself has not taken an effective lead. But now it seems the small user is beginning to turn to something that can lay down effective sanctions, and in helping himself he will also be helping the big installations which have suffered mainly in silence.

The fate of the industry may well be in the hands of these first, small cases – so don't ignore them.

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What Happens When...?

- **If a Vendor Promises a Successful Implementation** . . . and there is a costly failure, how do the parties share the losses involved?
- **If a Vendor Says the Hardware Will Handle the Job** . . . and it really can't, is the user forced to upgrade the hardware at his sole expense or alternatively give up the attempt to automate?
- **If the Vendor Provides a Software System Which Has Problems** . . . and tries to divert attention from the software by attacking the keypunch operators, the staff capability or other items, is he making himself responsible by not owning up to the problems he knows are present?
- **If the Vendor Says He Has Studied the Application** . . . and he hasn't, then what happens?
- **If the Vendor Says He Has Experts Available** . . . and their expertise isn't in the area needed, what happens?

This list of general interest points indicates the items that seem to be coming up for decision in the 1974 legal cases involving small computer systems. However, as can be seen, the principles involved will be important throughout the DP area, and may well control the future of the industry.

DP School Support Shows Decaying Industry Morals

By Walter A. DeLegall
Special to Computerworld

The price we often have to pay in a democracy, where freedom of speech is guaranteed by the Constitution and men defend to the death the right of others to say that with which they disagree, is unfortunately one that allows individuals to express viewpoints that are uninformed and unintelligent.

We recently got another opportunity to pay our democratic dues when we were exposed to Joseph Rigo's attempt to say something about which he knows little ["At Last . . . a Few Good Words on Private DP Schools," CW, May 8].

It is startling that the ombudsman for ACM, who supposedly has the responsibility to ferret out abuses and injustices in our industry, can be so insensitive to the exploitation perpetrated upon thousands of Americans who are seriously trying to better their circumstances.

Early in his article, there is evidence of why Rigo can find a few good things to say about the criminals reaping the benefits of the DP school bonanza. He makes the small-minded claim that DP schools "do not appeal to the better class of people."

Since Blacks and other minorities make up the majority of those enrolled in DP schools, it becomes clear who he considers the better class of people.

Rebuttal

Each year these criminals spend thousands of dollars in misleading advertising in an effort to exploit the hopes and aspirations of Black and Spanish-speaking individuals who are looking for an opportunity to salvage a future damaged by the public school experience.

Bruce Gilchrist, past executive director of the American Federation of Information Processing Societies (Afips), and the current director of computing activities at Columbia University, discovered in an investigation of 57 urban Better Business Bureaus that common complaints were:

- Misleading advertising.
- Financially unstable schools.
- Admission of unqualified students.
- Inadequate tuition refund policies.
- Inadequate training.
- Graduates unable to find employment in positions for which they were trained.

Steve Mindell of the New York State Attorney General's office has received numerous complaints from students, the most serious being cases where schools have gone out of business even before the actual start of classes. Enrollees found themselves left with nothing more than a note to pay for an education loan arranged for by the school itself.

Criminal Intent

Call these academic potshots if you will, but they would be more accurately described as evidence of criminal intent and practice.

Rigo makes the same ridiculous comparison between the trade school and the university as do most operators of DP schools. Obviously, he reaches the same conclusions, i.e., private DP schools are not so bad and everybody is picking on them. He comes off sounding about as convincing as Nixon trying to defend the "excesses" of his subordinates.

While he can find a few good words for the private DP school, he can find nothing good to say about Afips' Computer Careers booklet. As imperfect as it may be, it is at least an honest effort to provide the uninformed with some basis for making a decision about a career in data processing.

Rigo's rantings characterize a generally decaying moral and ethical concern in our industry highlighted in recent years by ACM's invitation to a South African government employee to present a paper detailing his racist research. Another example was the NYC/ACM decision to accept the membership of a programmer who tried to sell a million dollars worth of life insurance to students he taught in a DP training program for the disadvantaged. He told his students that his commissions would make it possible for him to donate his time to future programs.

There are those in the industry who maintain that issues which involve abuses of freedom and justice are political and therefore are not the concern of the computer professional. In that regard, a statement I made sometime ago seems appropriate: The computer professional must not allow himself to become so blinded by the obsession to remain apolitical that he fails to recognize that freedom and justice are not only political entities but moreover, they are moral imperatives which every man has an obligation to perpetuate. If he does, then surely, there will be no way left to distinguish him from his machines.

Walter A. DeLegall is president of Compatibility Processing Corp.

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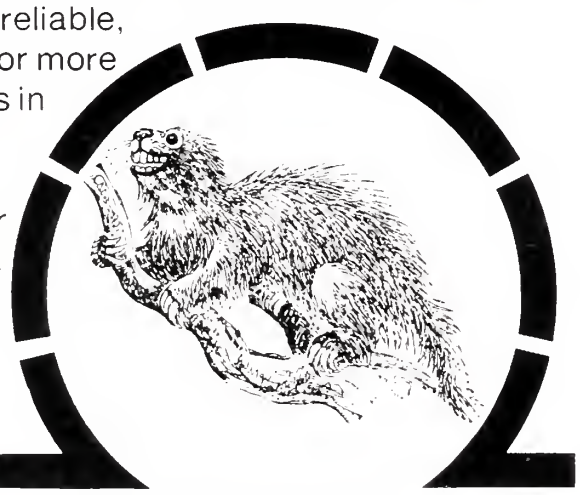

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Letters to the Editor

Birthdates Not Adequate To Measure Similarities

The Taylor Report of May 15 contained some interesting and useful concepts in correlation of similar records.

There is, however, one small area which should be addressed more thoroughly in developing measures of similarity. Birthdays (month and day) are not adequate data on which to base a similarity measure. Some elementary statistical analysis leads to the result that in any age group of 23 individuals taken at random, the chances are greater than 50% that two of them will have the same birthday (see Feller, *An Introduction to Probability Theory and Its Application,* page 31).

In larger groups, as might be found on a mailing list being checked by computer, it is almost certain that many pairs of individuals will have the same birthday. Thus it is never safe to do what was indicated in the example Case B – "The birthdate is incorrect by year, rather than by month and day . . ."

In fact, a further analysis would lead one to conclude that in rather homogeneous populations (young married couples, etc.) the range of birth years would be uniform and restricted enough to pose a serious problem in using birthdate (month, day, year). For example, if ages of people in a list were uniformly distributed over a 20-year period it would take only 101 in the group to reach a 50% chance of matched birthdates. Certainly large lists would have many redundant birthdates.

Robert Harbort
Robert Byers

Emory University
Atlanta, Ga.

U.S.-Funded Research Project

Charlotte's Imis May Benefit Many Municipalities

By Don Leavitt
Of the CW Staff

CHARLOTTE, N.C. – Charlotte is the direct beneficiary of a federally funded research and development project that may someday provide good, solid software systems to major cities throughout the country, regardless of what kind of computer systems they are using.

The Charlotte project was set in motion in 1970 when this city competed for and received a contract from the U.S. Department of Housing and Urban Development to conceptualize, design and implement major portions of an Integrated Municipal Information System (Imis). The contract was part of a major federal program sponsored by the Urban Information Systems Interagency Committee (Usac).

In accord with Usac thinking, the City of Charlotte formed a consortium with System Development Corp. (SDC), and the University of North Carolina, under which SDC would create the various system modules after detailed designs were put together by SDC and the city departments using them. The university's role is that of monitoring and evaluation.

Thus far, the consortium has developed and implemented several modules which the users have found extremely effective. Perhaps even more important, the team's work has been so machine-independent that SDC spokesmen anticipate no major problems later this year when they move from Univac Series 70 to Burroughs equipment.

The Imis modules must, according to Usac specifications, be municipally oriented and operations-based, as well as integrated (and therefore without needless duplication) and transferable. In other words, the information must be immediately useful and must be updated as a by-product of normal operations, even though summaries and consolidations of the information might be useful to other levels of government.

Most of the modules are oriented to interactive participation by user and system. One of the most immediately useful is a CRT-based fire operations module that displays all available information about each street address within the city.

The number of people usually at the address, special hazards, best entry points and details of water supplies are among the first entries displayed when an address is keyed in. Ownership information and fire inspection records can be called up later to complete the picture.

At one time, the consortium had considered installing hard-copy terminals in the vehicles answering an alarm, but a reevaluation convinced the planners that a CRT in the communications center would be a better approach.

The separation of the communications center from the fire scene would allow clearer interpretation of what the displayed data meant. The pertinent data could be sent by radio immediately to the fire fighters while they were en route to the scene, and supplying and maintaining of a whole collection of remote units could be avoided, the planners saw.

Less dramatic but equally cost-justified are other Imis modules keyed to equipment management, inventory and purchasing and personnel operations.

The equipment management module and the inventory/purchasing module work together, enabling the purchasing department to negotiate contracts with vendors based on real known needs, while the department charged with servicing the city's property – particularly vehicles – can search the records to determine exactly how much has been spent on a given car or truck, before authorizing any further work on it.

Comparisons with maintenance costs of similar vehicles across department lines, or comparisons with other vehicles within a single department can also provide the decision-maker with better perspective, the Imis planners said.

Personnel Data

The personnel operations subsystem supports more effective use of people already employed as well as a documented tracking of what happened to each application for employment received since the system was installed.

Charlotte Imis spokesmen noted that Wichita Falls, Texas, is also working on a total integrated systems contract, and various cities – including Dayton, Ohio, Long Beach, Calif., and Reading, Pa. – are working on specific subsystems under Usac sponsorship.

DMS-1100 Level 5 Simplifies Programming, Aids Administration With Codasyl Extensions

ROSEVILLE, Minn. – Univac's Roseville Development Center has released details of the features added to the DMS-1100 data base management system under Level 5, which is now being distributed to 1100 Series users.

The enhancements support both the individual application programmer and the data base administrator, and tend in several instances to be significant extensions to the Codasyl data base specifications which DMS-1100 has deliberately followed since the Univac software was first released in 1972.

Indexed Sequence

Level 5 now includes support for indexed sequential record storage, in addition to the direct, key calculation and "via set" options in the Codasyl specifications. Under the new indexed sequence backing, users can work with ascending or descending keys. The access method is very similar to IBM's Isam as far as the user is concerned, although there are internal differences, and an IBM Isam file cannot be used directly under DMS-1100.

Support for a pointer array, in place of pointers buried within each record in a chain, should mean much faster access under another Level 5 enhancement.

Further, support for generalized record-handling commands should allow programmers to be more flexible than under Codasyl. Use of an "identifier" in a Store command, for example, with the identifier initialized just before use to the particular area, record or set name, eliminates the need for multiple Store routines, the spokesmen said.

Under Level 5, Univac has allowed the segmentation of the on-line Data Management Routine so that users can reduce the amount of core previously required by this element of the system.

A "partial invoke" facility allows the programmer to specify those parts of the data base he really wants and simplifies the system's administrative chores accordingly.

Level 5 of DMS-1100 includes an extension and consolidation of utility functions available to the data base administrator, replacing what Univac itself referred to as a hodgepodge.

Paired AREA UP and AREA DOWN commands allow the administration to close off and then restore areas of main storage whenever a hardware failure or a logical problem put continued use of the specified area in doubt.

The DOWN command can allow current run units (programs) to continue while blocking all new ones, or it can halt everything immediately if that step is needed.

A selective area recovery feature closes off and then restores suspected bad areas on peripheral device storage. This feature allows continued use of unaffected areas on disk drives, however.

A Calc verify facility ties back to the calculation of location keys as part of the access methods available to the programmer. The enhancement now allows the administrator to verify the physical structure of the data base to determine that chains are intact, and to extract a range of statistics useful in planning for data base maintenance.

The formatted dump made available under Level 4 has been supplemented with a full octal dump capability under Level 5. There are times, Univac explained, when a reviewer needs to see a broader picture than is available in a formatted printout. Octal dumps have in fact been available before, but only in a separate utility package.

Level 5 of DMS-1100 is available free to 1100 Series users, Univac emphasized.

Micr Reject Support Automated

DETROIT – Banks using Burroughs Micr reader/sorters and the Item Processing System (IPS) for inputting and validating magnetic ink-encoded documents can now extend their systems with an Automatic Item Correction (AIC) facility just released by Burroughs.

The on-line approach to reconstruction and reentry of initially rejected items utilizes the multiprogramming capabilities of the Burroughs Master Control Program. AIC supports reconciliation of previously entered but out-of-balance batches, while regular item processing continues on later input.

Rejected Items Displayed

Under AIC, a Burroughs B9353 input and display system is used along with the Micr reader/sorter. Rejected items are displayed on the CRT screen, properly formatted, but with missing or unreadable characters shown as question marks.

The cursor automatically positions to each question mark. With the rejected items in hand, the operator keys in the defective characters and the system captures the dollar amount of the corrected item, adding it dynamically to the batch total.

The images of all rejects stay in place on the screen until the operator calls for the next page. With this retention, key-in errors can be corrected – and batch totals again recalculated – as often as necessary. The cursor can be positioned anywhere on the screen by the operator, even though it normally tracks the question mark characters without operator intervention.

Although AIC has no part in item processing until the correction phase, its dynamic facilities are in such sharp contrast to conventional reconciliation procedures, it speeds the entire entry process by a measurable amount, Burroughs said. No specific amount of speed-up could be cited, however, since it depends on the number of rejects a user installation has to handle.

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Not Merely 'Structured Programming'

'Structured Projects' Simplify Development Efforts

By Michael F. Smith
Special to Computerworld

Recent articles on structured programming indicate a breakthrough in coding techniques, simplifying software systems development projects. To what can we attribute this success? Project participants cite chief programmer team, top-down development, structured programming and development support library as elements of success.

While most participants tend to emphasize structured programming as the dominant aspect of success, I see an even more exciting concept – structured projects.

Let's first objectively review the "success components" of a structured project.

• The "chief programmer team" is an organizational method whereby a competent technician truly capable of designing and implementing the system is delegated the responsibility and adequate authority to design and implement the system.

A project officer is appointed to help with the managerial functions which the "chief programmer" is less equipped to handle. The fact that the chief removes himself from day-to-day activities is a credit to his management knowledge, and demonstrates a commitment to the project.

• Top-down development is a plan of implementation, where the means are derived from the desired end. Straight or main-line code is quickly developed by the chief programmer to bridge from the starting point to the objective. Support functions which make this code work are delegated to subordinate programmers.

When you define the "ends" before the "means" you're destined to formulate a good plan. Contrary to popular belief, plans need not have a layer of dust prior to implementation, but they must *exist* prior to timely execution. The initial "coded base" becomes the plan and the delegation becomes direction of subordinates toward a common objective.

• Structured programming is a technique used today in one form or other by documentation conscious Cobol programmers. It is code whose logic path is somewhat data independent. Moreover, the code is straight-line so that the execution logic flows with the listing.

Viewpoint

The coder has a close interaction with the chief programmer, and therefore persistent controls. The constant availability of this "technical source" tends also to resolve questions and provides additional guidance.

• The development support library is an interesting application of delegation. This basic management principle suggests that all activities be delegated to the lowest level.

Keypunching, submitting routine program updates, compiles, links and tests can be defined as exact written procedures. These can be delegated to the clerk level, thus freeing the programmer for programming. Moreover, this technique reduces the costly waste of task switching, previously required by the job.

Basic Principles

It seems, at long last, that a DP manager has rediscovered some basic principles, namely organization, planning, control and delegation.

The related practices of effective employee development and effective time utilization are also highlighted in a structured project approach.

I find it difficult to attribute to any single technique (structured programming) the unbalanced praise it has received. This is not to suggest that structured programming is not an excellent technique. I believe, more importantly, that the work of Baker & Mills with chief programmer teams has opened the door to a DP management technology.

We must pursue the concept of structured projects (as well as structured programs) and make every attempt to apply modified forms of modern management practices and techniques to DP projects. We must not begin with advanced GANTT or Pert forms, or even experiment with behavioral science. Let's start with the basics, then modify their form to fit the DP environment.

Michael F. Smith is manager of the technical staff at AGS Computers Inc., Union, N.J.

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Program Calculates Hydraulic Pipe Sizes

ATHENS, Ga. – Engineers planning complex hydraulic systems can get layout help with a Fortran IV program developed by the Naval Ship Research and Development Center now available from the Cosmic clearinghouse here.

The program calculates pipe sizes required for a piping network subjected to steady, one-dimensional, incompressible flow conditions. No restrictions are imposed on the type of network; the configuration may be divergent, convergent or a combination of both.

Variable temperature of the fluid is permitted up to a maximum of six values. Any one of six specified viscosities and associated densities may be assigned to each pipe section under any flow pattern.

A maximum of six flow patterns may be assigned to the network. The final calculated pipe sizes will be suitable for operation of the network under all flow patterns. Input required includes flow, path of flow indicators and heights and pressures at the end points.

Catalogued by Cosmic as DOD-00042, the program can be purchased for $450. Documentation is separately priced at $13.50.

Cosmic is at 112 Barrow Hall, University of Georgia, 30602.

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Simplifies Monitoring

TP Function Seen as System Peripheral

By Patrick Ward
Of the CW Staff

WEBSTER, N.Y. – "Communications is a peripheral to your [computer] system as much as a tape drive is," said Thomas Bowne, senior programming specialist at the Xerox computer center here.

Bowne's means of carrying out his philosophy is a Tech Control Center from International Communications Corp. that is slated to include 10 Codex and ICC 9,600 bit/sec modems on racks with patching devices, diagnostic equipment, dial backup, spare cable and modems all right there to create a network management center.

ICC normally installs a Tech Control Center only for an exclusively ICC modem user, but in this case an exception was made.

Less Intimidating

The neatly arranged system makes the communications operation less intimidating to operators, Bowne said, and provides the operators a chance for quicker and easier problem resolution.

Computer operators who feel at home with disks and tape tend to get tense about communications, Bowne observed. "The minute you mention it he wants to go take a cigarette break."

Since data processing systems require communication capabilities, data communication systems should be engineered to fit smoothly into the DP environment, Bowne said.

Bowne noted he had chosen "user-oriented" testing equipment and has done some human engineering on the button-and switch-ridden testing devices.

"We have taken green . . . paste-on dots and placed those at the correct [dial] position for everything, so all one has to do is put things to the green dot" as indicated in an operations manual.

The Xerox computer center plans to have two 9,600 bit/sec lines going to each of five regional centers, which in turn will communicate with over 80 branch centers using ICC modems, over 2,400 bit/sec lines.

One of the centers is already up and operating.

The branches will do their data entry on CRTs and transmit to a regional office after business hours.

Xerox Sigma 5 CPUs at the regional office will either do the branches' processing locally or create files for transmission to the Xerox computer center here.

The whole system uses full-duplex facilities operating in half-duplex mode, Bowne noted.

"We have a half-duplex discipline and we are paying half-duplex rates but we have full-duplex facilities," Bowne stated.

The choice is due to "protocol and existing software," he said, and also because "the full-duplex physical facilities give us the diagnostic capabilities that are just not present in half-duplex."

In the future, Bowne said he would like to use the network control system to provide more automatic fault awareness and perhaps computer-assisted fault isolation, problem definition and direction to the operator.

"Our basic system design is there," Bowne said. "We enhance it as we go along."

The idea is to integrate the data communications operations work into the overall computer system so there will be less dependence on engineers or specialized operators.

User Casebook

"There are just not that many well-trained communications people . . . especially in data communications," Bowne added.

A data-communications installation, he said, has to be geared toward operators reacting to and resolving a problem. How do you detect problems at three in the morning otherwise? he asked.

"Do you need a highly technical FE [field engineer] on site all the time?"

Bowne noted his group could have built its own network control center without ICC, but he felt bringing in the outside help saved him a great deal of staff time.

The network control system was not added to an existing communications operation, but was built on from the start, said Bowne, who strongly advises that approach. It makes for a simpler and more effective control center, he said.

The ICC-supplied control center added about 10% to the costs of installing the central sites communications equipment, Bowne noted. He justified the cost to management by emphasizing its service-restoration benefits primarily, but also the advantage it offers in dealing with multivendors by providing a central testing facility whose evidence they can accept.

Bowne said he had initially favored the network control center concept because he planned on using independent modems.

But then, he said, "we looked at the functional requirements of the system and we saw that even Bell modems require the same sort of support.

Xerox has already established a similar network control center at one of its five regional offices and plans to extend the concept to all five, Bowne concluded.

CNCP to Add Model 40 Terminal

MONTREAL – CNCP Telecommunications, one of Canada's common carriers, plans to add the Model 40 CRT terminal from Teletype Corp. to its Telenet system.

Telenet is a CNCP computer-controlled system which allows Canadian Telex and DataTelex users on the CNCP Private Wire Services (PWS) network to transmit messages through a central DP center.

The computer has the ability to receive hundreds of messages at the same time and retransmit them to their destinations. This avoids a "traffic jam" that would otherwise occur during peak traffic periods, when one teleprinter is communicating with another and tying up the line.

With Telenet, the Telex operator makes one transmission to the Telenet computer, the computer stores the messages and then forwards them to their destinations.

A subscriber joins Telenet by leasing a terminal – such as the Model 28 ASR, 32TC or in the future Model 40 – which gives him access to the Telenet system.

Telenet has other advantages, a spokesman noted, which include:

- Compatibility of different communications devices on the same network. PWS is a "dedicated" service that may operate at a different speed and code than Telex which is a "switched" service. The Telenet computer serves as a translator between the different terminals so they can communicate.
- Elimination of relays on multibranch network. A conventional network might have, for example, one circuit to the east and another to the west. A message from one circuit to the other has to be relayed by an operator and this takes time. The Telenet computer, however, does the relay automatically.
- Connection to the Telex system. A Telex terminal on the Telenet system has access to any one of the 27,000 Telex subscribers in Canada and 40,000 in the U.S.
- The customer controls his own network. Every Telenet system has a control station through which the client can control the operation of his network. He can, for example, order the computer to retrieve and reroute messages.
- Network privacy is assured the individual Telenet client, even though many subscribers use the same computer. Every client has, in addition to mnemonic codes, a unique table of identification codes registered in the Telenet computer. Every time a dedicated teleprinter or Telex teleprinter attempts to send a message, the computer checks to ensure that the calling station is an authorized user. (If it is not, the message is not accepted.)

In the same way, when forwarding the message to the destination terminal, the computer verifies the assigned unique code for that terminal.

SP, Pacific Bell Clash Over Plans For Calif. Service

By Ronald A. Frank
Of the CW Staff

SAN FRANCISCO – The Bell System and the specialized carriers have defined a new area in which to decide who will provide private-line communications services. The new arena involves Southern Pacific (SP Communications) and Pacific Telephone & Telegraph (PT&T), and both companies want to provide new intrastate services within California.

SP Communications applied to the State Public Utilities Commission (PUC) recently to begin intrastate service on May 13. But PT&T objected and told the PUC the proposed service was an " 'intended intrusion' into areas already served by Pacific Telephone [and] is not in the public interest."

The PT&T response was typical of Bell objections to service proposals from a specialized carrier, but the local phone company went one step further. It told the PUC that if SP Communications is allowed to introduce an intrastate service, PT&T will file a high/low density tariff for customers within California.

The high/low-type tariff originally was proposed by AT&T to the FCC for interstate private-line service. It would restructure rates so users on heavily utilized routes would pay lower rates while users in outlying areas would pay higher charges. The high/low proposal was one of Bell's main counterattacks against the advent of specialized carrier services. It is currently pending before the FCC.

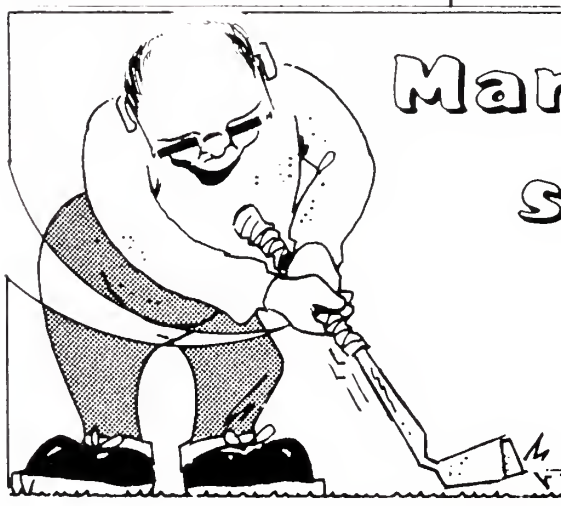
The PT&T move objecting to the SP Communications service said the rates proposed by the specialized carrier are "much lower" than those in effect for PT&T customers. And the phone company said it would have to counter with a high/low plan as a competitive response.

PT&T made it clear it would offer the restructured rates only if SP Communications is granted approval to offer intrastate service to its customers.

In suspending the SP Communications proposal until Sept. 10, the PUC said among other stipulations that "no public need has been demonstrated for the establishment of [Southern Pacific's] services." The order also stated the proposed service "is a duplication of service now provided by PT&T.

According to a PUC spokesman, the commission plans to hold hearings and it will initiate an investigation to determine whether the proposal is "unreasonable or unlawful."

Under California regulations, the proposal could be suspended for another six months if no final decision is made, before the September deadline.



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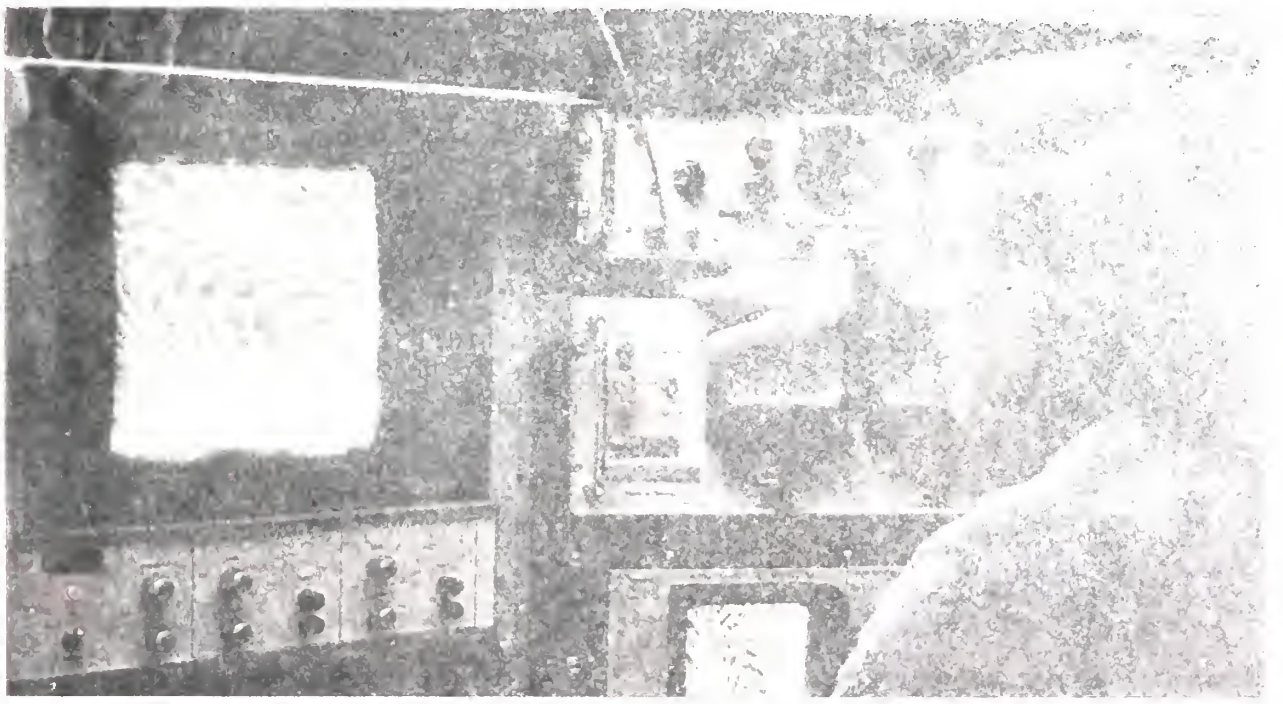
DP DIALOG

Notes and observations from IBM which may prove of interest to data processing professionals.

DP DIALOG appears regularly in these pages. As its name suggests, we hope DP DIALOG will be a two-way medium for DP professionals. We'd like to hear from you. Just write: Editor, DP DIALOG, IBM Data Processing Division, White Plains, N.Y. 10604.



Dr. Alec Broers examines an X-ray image-forming device with the new low-loss scanning electron microscope.

Exploring An Invisible Realm

With their incredible densities, computer components are rapidly approaching dimensions no longer visible with even the best of optical microscopes. Now, two IBM scientists have made a major advance in electron optics, a key to further technological progress. Dr. Oliver Wells and Dr. Alec Broers have developed a new method for operating the scanning electron microscope which may allow researchers to see surface details as small as 10 angstroms—or a few atoms wide—on many objects.

Among the samples being examined are specimens ranging from blood cells to minute electronic components to the experimental X-ray image-forming device pictured above, a development being pursued by Michael Hatzakis and Dr. David Sayre, also members of the Thomas J. Watson Research Center in Yorktown Heights, N.Y.

Whatever the eventual applications of their development, both Drs. Wells and Broers agree that, in areas from medicine to metallurgy, "This new low-loss electron method gives us a chance to examine the world around us, to discover what was perhaps unknown before."

In a conventional surface scanning microscope, now a standard research tool, a beam of electrons scans a specimen. Secondary electrons are ejected from each point on the surface as the beam moves back and forth. At the same time, a spot is scanned across a cathode ray tube. The strength of the ejected electron signal controls the brightness of the CRT beam, resulting in a picture of the surface under study.

The microscope's resolution, or ability to clearly distinguish smaller features, is limited because the specimen must be focused as much as a centimeter from the electromagnetic lens to collect electrons efficiently.

In another type of standard microscope—called a transmission microscope—objects can be placed as close as a tenth of a centimeter to the lens. But because in this case the electrons pass right through the specimen to form the picture, only thinly-sliced samples can be examined.

Drs. Wells and Broers have combined the two techniques so that the surface of solid samples can be seen with extremely high resolution. While the sample is placed in the same position as in the transmission microscope, the key difference in their development is the use of low-loss electrons—original electrons from the beam that lose very little energy on striking a solid surface. Low-loss electrons which bounce off the sample surface are pulled back by the lower half of the lens and are collected to provide the output signal.

The new electron microscope has been in its present form since the Spring of 1973, although it had gone through several stages of development before that time. It is currently capable of useful magnification up to 300,000 times.

How Data Entry is Working for the Tappan Company

To meet the need for timely sales and production information, the Tappan Company is using teleprocessing to home in on the ranges. Key elements in the network, which also provides data on other products in the firm's Appliance Group: a System/370 Model 145 at Tappan's Mansfield, Ohio headquarters and IBM 3740 data entry systems at 12 major distribution and manufacturing centers across the country.

The Appliance Group initially used communication terminals to link remote facilities with the central computer. "The terminals served our purpose in getting the program underway," says Don Jenkins, Data Processing Operations Manager, "but they don't compare with the 3740's speed, ease of operation and user acceptance. The 3740 offers much higher data transmission rates, has a faster printer, and the visual CRT verification reduces operator error."

With the communication terminals, operators keyed order information into batch buffers. These were later polled by the central computer, and during the evening this data was fed into the Appliance Group's comprehensive finished goods system.

Early the following morning, headquarters returned data files to the distribution and manufacturing sites, where the required shipping information, in-transit reports, orders, invoices, manufacturing schedules, current inventory status and exception reports were generated.

Recently, Tappan installed a 3741 dual data station and 3713 printer at each remote location. Operators now enter order data onto the 3740 diskette.

"Originally, it took time to educate our personnel at the remote sites to do things differently," Jenkins explains.

For Tappan's Appliance Group, the 3740 data entry system is a key element in a teleprocessing network that links the company's headquarters with major distribution and manufacturing facilities.

The similarity between the old and new procedures, and the operator features of the 3740, made installation of the new equipment "very easy, almost an evolution," he adds.

The Appliance Group has also moved to 3742 dual data stations to meet its headquarters data entry needs. And, in several instances, central machines and data entry personnel have been moved directly into user departments.

"This has proved to be a real asset," Jenkins notes. "Data entry operators are finding short-cuts, redundancies we never would have found centrally, and they're gaining a real identification with users, and a better understanding of what the business is about."

"The 3740 has resulted in decidedly greater productivity," Jenkins says. "Our operators like it better—and their work clearly shows it."

System/360: A Decade Later.

Over ten years ago, on April 7, 1964, IBM introduced System 360 at meetings of more than 150,000 people in nearly 100 countries around the world. "In the annals of major product changes," observed one leading business magazine at the time, it was like the "switch from the Model T to the Model A." The announcement was, indeed, dramatic in scope and far-reaching in its effect.

A decade later, System 360 spans nearly half the history of computing, a history that stretches from the ENIAC and Whirlwind I to virtual systems. It provides a benchmark against which to measure an industry's startling growth and a perspective on how much the computer's capabilities have expanded.

Take growth, for example. One estimate puts the total number of systems in use in 1964 at about 20,000. By 1971, when the first System 370 was delivered, that figure had quadrupled to over 80,000. Today, the total is estimated at well over 100,000.

Growth in the computer's capabilities has more than kept pace. System 360 was introduced as a compatible family in 19 combinations of speed and memory size—the largest 50 times more powerful than the smallest.

It offered a two-fold improvement in price performance and a system architecture able to accommodate both scientific and commercial applications. Even in an industry which moves in seven-league strides, these were bold and dramatic departures.

Today, System 360's integrated circuitry has been overtaken by the monolithics and MOSFETs of System 370; the operating system has made the quantum jump to the virtual system; the promise of teleprocessing and management information systems has become the reality of data base data communications networks.

Ten years ago, the smallest, least expensive System 360 was the Model 30. Now, a similarly configured System 370 Model 125 could cost less, have twice the real memory, double the on-line direct access storage with fewer spindles, five times the direct access data transfer rate and more room for writing instructions than even the *largest* System 360—up to 16 million characters of virtual storage. That kind of progress is characteristic of data processing. It may be worth recalling that a significant share of it began on April 7, 1964. It was quite a day. Quite a debut. Quite a decade.

IBM

Cheese, Music, Puzzles Result in Tailor-made Curriculum

Nearly half of all college students never graduate. But one college in Michigan has cut its dropout rate to 20% by using a computer to help show teachers what makes their students tick.

Dr. Joseph E. Hill, after becoming president of Oakland Community College in a suburb of Detroit, adopted a new technique which tests a student's ability to understand the world around him. The way individual students respond helps the faculty determine what the best learning environment is for each one—whether it be a classroom, individual study with programmed materials, informal conferences with classmates or a combination of all these approaches.

Instead of the standard battery of diagnostic tests which most students undertake, Oakland asks them to participate in such diverse activities as tasting cheese, listening to music or assembling puzzles.

Dr. Hill says, "In one test for example, we ask the students to walk a line—but we put a chair in the way. What they do tells us whether they're likely to follow instructions to the letter or go their own way."

"We know everybody is different. Some feel and see and hear things that others don't. Some reason logically, others impulsively. To pull together all these variables we have programmed an IBM computer to process tests results and produce a 'map' of each individual's style of learning—his cognitive style. With these maps we can personalize study programs and put each student in a learning situation which is best for him."

The study program does not rule out the traditional classroom and lecture hall method, but offers alternatives to students who are geared to learning better in other ways.

In 1973 over half the 15,000 students at Oakland took the cognitive style tests. By 1975 Dr. Hill hopes to have facilities for at least 60%.

He first used computer analysis to process results of cognitive style mapping while serving as consultant to Detroit's federally funded Urban Adult Education project in the mid-Sixties. In the early stages of his research Dr. Hill worked out cognitive style maps by hand but he says "it wasn't practical. The variables for any one individual's development process are so great you need a computer to process them. In fact, from pre-school to the second year of graduate school more than 1,000,000 profiles are possible. There are more than 3,000 possible profiles at a given level of educational development, although between five and seven hundred are most commonly found."

While cognitive style mapping has already gained acceptance at many other colleges and secondary schools throughout the United States and Canada, Dr. Hill hopes eventually this new testing procedure will become even more widely accepted. "It's about time we adjusted our teaching styles to the learning styles of each student. We should begin to teach students as though they would pass, not as if they would fail."

IBM

Cheese tasting tests a student's differentiation powers through taste, smell and sight.

What this student does with the chair in her path will indicate how prone she is to following instructions to the letter or just going her own way.

This student tests his motor skills by passing a wire loop over an undulating electric "eel" without touching the surface.

Sidelines

New Aid to Medicine

At the Texas Institute for Rehabilitation and Research in Houston, scientists are using an IBM computer to produce highly accurate, three-dimensional measurements of the human body for studies ranging from spinal deformities in children to weight loss in astronauts.

Overlapping photographs of the body are taken simultaneously. Then a plotting device, like the type used in aerial mapping, identifies reference points common to each photo to create a three dimensional image. These reference points, which can number over 40,000, are fed into the computer to produce precise measurements of the entire body or any part of it. With a computer driven plotter, such measurements can be shown in a number of ways—the contour map of the body pictured above, or cross sections of the body, or graphs showing how body volume is distributed from head to foot—to assist doctors in their diagnosis and treatment of a wide variety of medical disorders.

Energy Conservation

With the double-edged problem of uncertain fuel supplies and spiraling power costs, more and more businesses and large institutions are seeking new ways to conserve energy. In Jacksonville, Florida, the Gulf Life Insurance Company is meeting both problems in its 27-story home office building with the help of an IBM System 7. Operating under IBM's Power Monitoring and Control program, the system checks the entire structure's power demand every 30 seconds. As demand approaches a pre-determined limit, the computer begins to systematically cut back on power consumption without appreciably affecting the comfort of building occupants.

Company officials estimate the System 7 will help reduce Gulf Life's use of electric power by better than 18% a year. They also expect to see net savings of more than $75,000 annually in power costs.

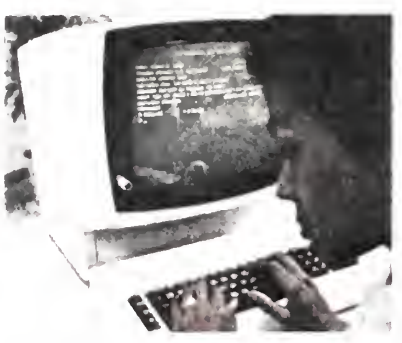
Streamlined Data Entry from Remote Locations

For computer users whose business information is dispersed over multiple locations—like insurance companies and distribution firms—the recently-announced IBM 3790 Communications System can provide new remote processing capabilities and streamline the flow of information to the central computer.

In processing an application for an automobile policy, for example, an insurance agent need only key in data at his remote location. The 3790 can immediately check the format and accuracy of the data, scan appropriate rate tables, determine the proper premiums and even calculate the agent's commission.

In addition to this stand-alone feature and ability to process and store data for later batch transmission, the 3790 will also interact with most virtual storage models of System 370, giving remote offices direct access to master records and the additional processing power of larger host computers.

Key to the 3790 system is the programmable controller. Also available are display units, keyboard printers, communication terminals, line printers and an optional auxiliary control unit.



IBM. ®

74-3

Japanese Rail Net to Handle 1.4 Million Reservations Daily

By Shukan Computer
Special to Computerworld

A computer communications network capable of handling up to 1.4 million passenger reservations daily will be part of the planned expansion being implemented by Japan's National Railway.

With the extension of the line to Hakata scheduled for completion in October, the National Railway is working on strengthening its reserved ticket sale system, "Mars 105," and its group reservation system, and creating a telephone reservation system.

The Mars 105 can now accommodate and assign 700,000 seats daily, but when the Hakata extension opens, its capacity will increase to one million.

According to plans, twice the present capacity, or roughly 1.4 million seats, will become possible eventually. For the immediate need to accommodate one million places, the National Railway Computer Center in Tokyo will increase the number of Hitac 8700 CPUs by three; Mars 105 alone will be using six Hitac 8700s.

The six computers will consist of units for communication control linking terminal units at ticket sales windows and other computer systems, and computers for use in seat files. The terminals at ticket windows will be expanded and high-speed terminals installed at principal station windows. The high speed terminals will have a transmission speed about 10 times (2,400 bit/sec) that of present units (200 bit/sec), and line printers will be used for the preparation of tickets.

Inquiries by Phone

The telephone reservation system, "Mars 150," is designed so that inquiries on the availability of tickets as well as reservations can be made from homes and offices through a pushbutton phone. Plans call for service to begin in November with the cooperation of Nihon Tel & Tel, with pushbutton phone subscribers in Tokyo's telephone district as its users.

Trains for which reservations can be made will be limited express trains departing from and arriving in Tokyo. At the beginning, the daily capacity will be about 20,000 seats. Future plans are to extend service to Osaka and Nagoya.

This system is designed so that after calling the audio response unit at the phone reservation center on the pushbutton phone, one can enter the desired date, train name and first and last station names, according to the instructions of the audio response unit.

The request is directly transmitted to the computers (two Hitac 8400s), a seat is automatically reserved in the Mars 105 and as this is being recorded in the Mars 150 reservation file, the reservation number is transmitted vocally through the pushbutton phone via the audio response unit. At the time of purchase, the reservation number is given to the window clerk who operates the terminal and issues tickets.

The audio response unit of this system is the intermediary between the pushbutton phone and the central phone reservation unit. Transcribed human voice, analyzed according to word units, is recorded on a magnetic drum. It first accepts input data from the phone, then selects the words necessary for it, edits them, arranges them into a meaningful sentence and issues vocal output.

Meanwhile, it edits this input data and requests a reserved seat from the central phone reservation unit from which it obtains a reply, the contents of which are

(Continued on Page 22)

A SOURCE PROGRAM MAINTENANCE AND UPDATE FACILITY FOR $675

- batch-oriented system, similar to the popular UPDATE facility, available on CDC 6000 series computers
- maintains libraries in compressed format, on tape and or disk
- operates on 360 370, under OS,VS, with MFT,MVT
- character substitution capability
- no more condensing
- 30 day free trial, no obligation

Try the system. Send us a description of your configuration and a tape, and we'll forward SLUF with installation and user documentation.

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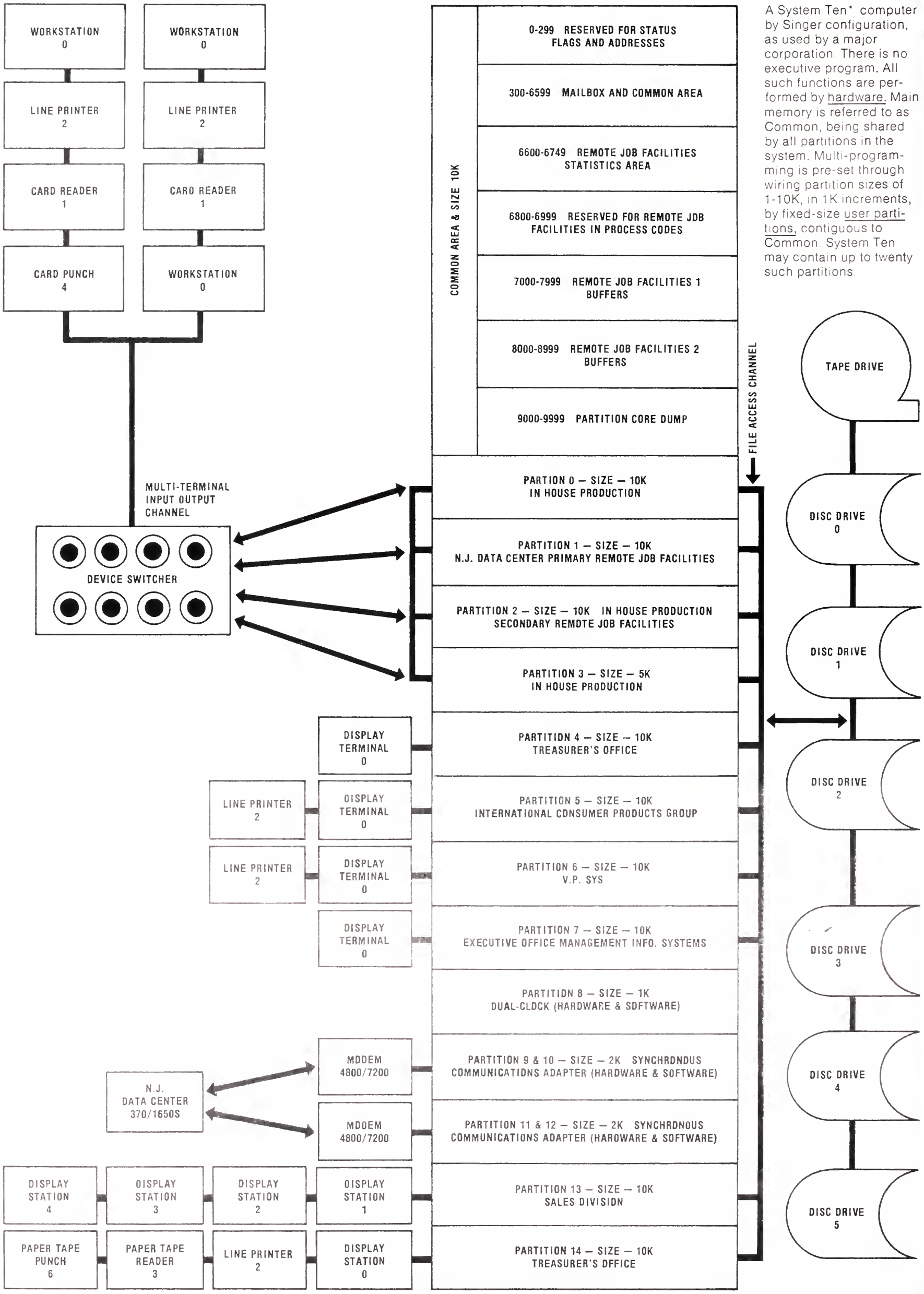
SYSTEM TEN CONFIGURATION (110K)



A System Ten* computer by Singer configuration, as used by a major corporation. There is no executive program. All such functions are performed by hardware. Main memory is referred to as Common, being shared by all partitions in the system. Multi-programming is pre-set through wiring partition sizes of 1-10K, in 1K increments, by fixed-size user partitions, contiguous to Common. System Ten may contain up to twenty such partitions.

SYSTEM TEN BY SINGER

A system with up to 110,000 characters of memory on-line disc storage, magnetic tape, and up to 200-user multi-programming capability, all at a remarkable low price. Astonishing? Not at all. It is System Ten* computer by Singer.

System Ten is unique in that it is a fixed-partition, multi-programming system that does not need a large and elaborate executive program.

Instead, all executive functions are performed by the hardware.

System Ten provides fixed partition multi-programming: each program is assigned a fixed-sized, contiguous area of main memory referred to as a user partition.

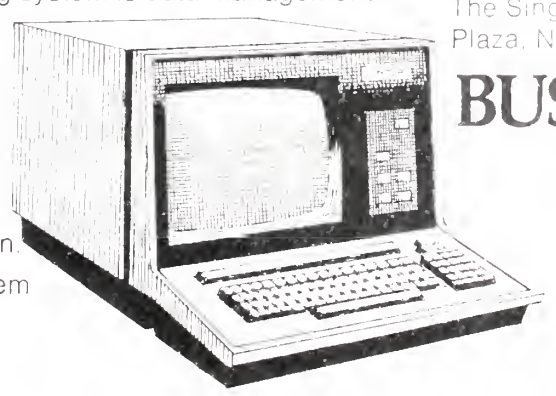
System Ten can handle up to twenty such partitions.

Unlike other multi-programming systems, System Ten has an area of main memory referred to as Common, which is shared by all programs in the system. This makes it possible for otherwise independent programs to exchange information at main memory speeds and to share common subroutines.

Each partition's control of the processor is hardware-monitored through a round-robin time-slicing priority system.

Core memory can be divided into a total of twenty fixed partitions, each holding one program at a time, and serviced by a single I/O channel, to which up to ten peripheral devices operating at up to 1500 characters per second may be connected.

Multi-programming with hardware instead of software has some big advantages. It is far less costly than an expensive, core-consuming, software operating system. Operating in conjunction with the hardwired operating system is data management software: disc management facility (DMF). Its functions include task selection, priority assignment, I/O supervision, and interrupt handling. Another obvious advantage is that the total memory capacity is always available for the programs necessary to the system's application.



The hardware operating system allocates the processor to each [illegible]

Despite its power and [illegible] fewer demands on your programmers and [illegible] stable. For instance, I/O supervision and [illegible] of the hardwired system design. This relieves [illegible] handling I/O completion tasks. Since the [illegible] partitions are plugboard-controlled, [illegible] changes merely by changing the [illegible] simplicity is also carried over into [illegible] System Ten is ideal for remote locations [illegible] are needed to operate it, or even [illegible]

VERSATILITY IN PERIPHERALS

System Ten in a central [illegible] peripherals in remote areas. Each [illegible] channel. Up to ten I/O devices can be [illegible] per partition depending upon the I/O device buffering [illegible]

And you have a wide variety of I/O [illegible] from. User-oriented terminals such [illegible] Communication interfaces directly, [illegible] I/Os, such as card readers and printers. High [illegible] as magnetic tape drives, disc drives [illegible] channel (FAC).

No matter how many devices [illegible] the large on-line data base is access[illegible]

That is System Ten by Singer. [illegible] whole story. We would like to share [illegible] technical reports and brochures [illegible] nearest Singer Business Machines [illegible] The Singer Company, Business Machines [illegible] Plaza, New York, N.Y. 10020.

BUSINESS MACHINES BY SINGER

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165
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COMPUTER MARKETING INC.
(215) 635-6112
7704 Seminole Ave., Melrose Park, Pa. 19126

Pocket-Size Unit Tests Modem Interface

LITTLE SILVER, N.J. — A pocket-size modem interface test set that isolates and identifies data transmission problems between data terminal and data transmission equipment is available from NuData Corp.

The 25-function Model 921-S battery-powered unit tests interconnections between modems and terminals in systems conforming to EIA RS 232C standards. Priced at $150, it allows visual monitoring of nine leads, has mark and space signal simulation capability and provides micro miniature switch lead programming.

The 921-S contains seven LEDs that monitor the Transmit Data, Received Data, Request to Send, Clear to Send, Data Set Ready and Data Terminal Ready leads. Interface signal voltage greater than +3 V actuates the LED.

In addition, two more independent LEDs are available for connection to any open pin on the terminal or modem side to monitor positive voltage from +3 V to +24 V or negative voltage from -3 V to -24 V.

The 921-S test set has 25 direct access interconnecting leads with built in male-female connectors that can be disconnected and cross-connected to any terminal by cord patching or independent switching. Patch cords are used to perform all nonstandard interconnects and mark and space signal simulation.

The front panel of the test set holds all controls and indicators for two multijumpers and nine lamps for interface control and indication.

NuData Corp. is at 32 Fairview Ave.

Modem Eliminator Transmits 23 Mi

NEWTON, Mass. — Codex Corp. has introduced its 8200 Local Distribution Service Unit (LDSU) which allows users to eliminate modems on high-speed lines connected by metallic wire pairs. It will operate up to 23 miles at 2,400 bit/sec, the company said.

The 8200 operates at 2,400-, 4,800-, 7,200-, 9,600- and 19,200 bit/sec over unloaded unconditioned local loops. The unit will operate with four-wire half duplex and full duplex; two-wire half duplex and simplex lines and uses a differential di-phase technique for immunity from background noise distortion and other line variations, Codex said.

Diagnostic capabilities of the 8200 include local and remote loopback so operators can determine system performance and isolate malfunctions. The device conforms to Bell System specifications for metallic circuits on private line facilities.

The 8200 is priced at $995 and deliveries will begin in July from 15 Riverdale Ave., 02195.

Japanese Rail Plans Network

(Continued from Page 19)

again converted to voice and issued through the phone.

As for the group reservation system, the capacity of the present Mars 201 (with daily accommodation of 320,000 seats) will be raised to handle up to 900,000 seats and be newly established as Mars 202. The immediate need is for 600,000 seats.

The computer is a single Hitac 8450 which is linked to Mars 105 computers, so seats also may be reserved.

Additions will be made for group reservations by developing new terminals which use Braun CRT displays which will be set up chiefly in tourist centers.

Data Set 208B-Compatible

SILVER SPRING, Md. — Rixon, Inc. has introduced a 4,800 bit/sec data set which is "end-to-end" compatible with the Bell 208B for operation on dial-up lines.

Called the T208B, the data set can handle half-duplex mode transmissions over two-wire dial-up facilities. It includes automatic answer and continuously adaptive automatic equalization. Diagnostic features include analog loopback, self-test, receive-only and remote test capabilities.

The device provides automatic echo supressor disabling and alternate voice/data when used with a 565HK phone. The data set is priced at $3,750 with first deliveries in June. Rixon is at 2120 Industrial Parkway.

Which RJE you use depends on where you use it.

Your tiny remote office in Sioux Falls?
Your regional headquarters in Atlanta?
Your manufacturing division in Dallas?

At each location your RJE needs are different. So it takes a choice of RJE systems to do the job right.

And at the right price.

MDS offers you a range of compatible systems that lets you match capability precisely to the job. As they work together, they form a Network Approach to job entry that makes data processing work harder, at lower cost.

For instance, there's our new System 2300 for smaller needs, smaller budgets. At rates to 9600 bps in 2780 or 3780 modes. Choose cartridge magnetic tape to handle data when unattended.

Or tie it to a card reader, a printer, or let it convert from one medium to another. The tutorial CRT guides job setup, makes corrections easier, mistakes fewer.

At your larger sites, you'll want the MDS System 2400 RJE terminal. It's a high-speed terminal, with intelligent pre-processing and data purification. It can also be a 24-key station key-to-disk.

Concurrently. Or alternately.

You can have off line print or media conversion, too. System 2400 does the big, tough jobs.

For high-volume remote batch key entry, you'll use the 2400 key-to-disk. Or our new 1200 key-to-disk (for the 4-to-12 key station shop). It's got a lot of the big-system sophistication, but it's priced right for the smaller operation.

A selected mix of these and other MDS systems to form a network of distributed data-entry alternatives gives you complete compatibility and cascading efficiency.

That's the MDS Network Approach to data entry. For more information about it, talk to an MDS representative. Call or write him at your nearby MDS office. Or contact us at headquarters at 315-792-2424.

Mohawk Data Sciences MDS.

The Network Approach to data entry.

SYSTEMS PERIPHERALS

Bits & Pieces

Microfilm Unit Can Store, Search, Retrieve 1M Pages

NORTH ARLINGTON, N.J. The MRS 90 graphic communications system from Ragen Precision Industries, Inc. can store up to a million pages of computer output on microfilm, carry out a search parameter, and retrieve, display and copy any one page or series of pages.

The system is said to be capable of automatically delivering any one of a million pages of 16mm rolled microfilm.

One system can control up to 15 remote terminals and be configured to include four times the memory capacity of the standard system.

The MRS 90 consists of a random access storage and retrieval unit, computer-controlled memory and a copier. The basic system, consisting of a terminal, copier, communications keyboard and memory unit, can be purchased for $63,500 or rented for $2,000/mo from the firm at 9 Porter Ave., 07032.

Zeta Plotter Draws 8.1 In./sec, 34 In. Across

LAFAYETTE, Calif. – A plotter with a 34-in. plotting width from Zeta Research operates at 3,240 step/sec.

The Model 3640 can plot at speeds up to 8.1 in./sec connected by a telephone hookup to a central computer. Four pens are standard and each pen can plot the 34-in. width. Rolls of paper 120 ft long can be used.

The plotter is priced at $19,200 from the firm at 1043 Stuart St., 94549.

HP Interfaces Line Printer To Its Series 9800 Calculators

PALO ALTO, Calif. – Hewlett-Packard has interfaced its 2607A line printer to its Series 9800 calculators with an 11287A interface. This gives a calculator user a 132 char./line printer with a speed of 200 line/min.

A 64-character Ascii set is standard with an optional 128-character set that can print both upper- and lower-case letters in a 5 by 9 dot matrix. The interface is priced at $300 and the printer is priced at $7,300 from the firm at 1501 Page Mill Road, 94304.

Big Bubbles for Display?

YORKTOWN HEIGHTS, N.Y. – Sandwiched between two glass plates, liquid magnetic bubbles about the size of a period may be useful as the basic elements of a low-cost graphic display, according to IBM researchers.

Their experiments have shown that liquid bubble behavior in a 20 times size replica of a circuit previously designed for solid state bubble memories provides a large-scale analog of bubble domain behavior. The bigger liquid bubbles, however, are "easily visible" and could form figures, they said.

For Univac 494 User

Calcomp Unit Ups Speed, Channel Load

By Vic Farmer
Of the CW Staff

ST. PAUL, Minn. – Slowly but surely Univac users are reaping the benefits IBM users have had with independent disk vendors. Northwest Orient Airlines here is a case in point.

Northwest uses Calcomp 1144 disk drives on a Univac 494 system for its computerized reservation system, Insta-Res.

The airline has completely automated such major applications as passenger name record handling, seat inventory control, flight information, schedules and schedule display, on-line schedule changes and reboarding, bin stage switching, interline booking and meal ordering, according to Ronald Sandve, Northwest manager of real-time systems.

The Disk User: Two Casebooks

For IBM 360/75 User

3330-Type Performance Gained Through Use of Memorex Drives

WILMINGTON, Mass. – "We believe our IBM 360 has a relatively long remaining useful life. Its major weakness, from our viewpoint, was the absence of the newer high performance peripherals."

And with this philosophy, Dick Bibaud, director of Avco Computer Services (ACS), recently enhanced the firm's 360/75 with an independently manufactured 100M byte/spindle 3330-type disk drive system.

By upgrading with the independent on-line storage equipment, ACS realized operating benefits inherent in the latest generation of disk storage equipment without the immediate need to install a 370.

Benefits accrued by replacing the firm's 2314-type drives include:

- A 1.7 times increase in storage capacity – eight Memorex 3670 spindles of 100M bytes each versus 16 2314 drives of 29.17M bytes.
- A 60% reduction in cost per byte (both the new and former drives were purchased).
- A 2.6 times increase in data transfer rate – from 312- to 806K byte/sec.
- A 64% savings in average rated access time – from 75- to 27 msec.
- A system throughput improvement of approximately 10%.

The interface to the 360/75 required an optional Memorex 2860 selector channel attachment feature for each of two channels and allows full functional capability. ACS reports improved balance and less channel contention than with its prior 2314 equipment configuration.

A software simulation, providing 360 and Memorex 3670 compatibility by effectively changing the selector channel to a block multiplexer-type channel, allows full realization of rotational positional sensing.

This benefit to system throughput, [illegible] paired with the 3671 [illegible] disks, allows the 3671 control unit Memorex 3671 model [illegible] disconnect during [illegible] As a result, the CPU [illegible] for other operations while a read/[illegible] head seeks [illegible] searches a specific [illegible] record.

Software support of the selector channel is Memorex-maintained within OS MVT Hasp 21.7. Basically, this amounts to inserting assembler code modifications within the input output supervisor of the operating system.

"Due to our burgeoning data base [illegible] connection with our rapidly expanding client requirements, we were in dire need of additional storage," explained Bibaud.

The company had several alternatives, among them, the addition of numerous banks of 2314-type equipment. This alternative was rejected as too slow and costly, however, Bibaud said.

The existing complement of Memorex disks, installed last January and consisting of one 3671 storage control unit and eight 3670 spindles, is expected to be doubled this spring, again replacing 2314-type equipment.

And Northwest [illegible] information [illegible] including the [illegible] a part [illegible] to [illegible] and upgrade [illegible] for the [illegible]

The [illegible] 131K 704-[illegible] and drives, [illegible] ing of 700 [illegible] 500 Model 2[illegible] 50 [illegible] writers and [illegible]

The data [illegible] com-bination [illegible] 5782 [illegible] and [illegible] Meet-ing the [illegible] to pro-[illegible] sys-tem.

50,000 Transaction Hour

The [illegible] the ability [illegible] 50,000 transac-tions [illegible] hour. To [illegible] 14 [illegible] and [illegible] 12 com-mand [illegible] com-mon [illegible] hours. The aver-age [illegible] up to 50,000 [illegible] under [illegible]

The [illegible] Collins [illegible] of 360 [illegible] Univac 1460 [illegible] and, [illegible] placed [illegible] in 1973. The Calcomp [illegible] approximately 40 [illegible] 1460 and more than [illegible] and Mr. Sandve [illegible] Northwest [illegible] 60 in-stalled [illegible] with the Calcomp 1144 disk sys-tem [illegible]

The Calcomp [illegible] average ac-cess [illegible] 42.5 [illegible] Northwest has eight Calcomp 244 spindle [illegible] on two high speed channels. The total capacity of the system is 905M 36-bit words.

Over 700,000 passenger records may be [illegible] for instant [illegible] and modification.

The present Calcomp configuration can support a transaction rate of 17-1/2 transaction/sec without experiencing channel overloading, Sandve said.

FPP Boosts Varian Speed 15X

IRVINE, Calif. – The Model 3400 Floating-Point Processor (FPP) from Varian Data Machines can increase the speed of floating-point calculations on V70 series minicomputers by a factor of 15 over software subroutines, according to the company.

The normal numerical limit for data processed by 16-bit computers is ± 32K bits. Floating-point calculations, based on exponential values of 10, effectively remove this limitation. Whole numbers and fractions, with up to 75 zeros to the right or left of the decimal point, can be added, subtracted, multiplied or divided.

Performed solely in software, floating-point calculations are complex and time-consuming Varian noted. With the 3400, all floating-point additions, subtractions, multiplications and divisions are performed in hardware.

The FPP can process both single-precision and double-precision data, has its own direct access to memory and instruction pipeline and is controlled by its own set of assembler and Fortran-compiled instructions. Results are stored in a 56-bit accumulator, then coded into 16-bit words for transfer back to the system memory.

The 3400 is priced at $4,950 from the firm at 2722 Michelson Drive, 92664.

Reports late? Try our 8040 wait-reducing plan.

Efficient data collection calls for accurate data entry, storage and transmission – so reports from central processing can be expedited for decision making. Sanders' 8040 Remote Batch Terminal System delivers. An intelligent, single-terminal system using dual-cassette storage, the 8040 can simulate source-document formats, has superior data validation, editing and error-checking features and does not require highly trained, costly operators. The 8040 is another example of Sanders' great depth in technology and distributed data processing experience. Sanders Data Systems, Inc., Daniel Webster Highway-South, Nashua, N.H. 03060. Call (603) 885-3727.

Sanders...the intelligent answer

European Sales Offices: Sanders Data Systems, Ltd., 51/53 Brick Street, London W1Y 7DU, England; Sanders Data Systems, GmbH, 6000 Frankfurt/Main, Rennbahnstrasse 72/74, West Germany.

Recurring Computer Nightmare #10

The day the IRS closed in on Reggie Van Cabot III.

Maybe the auditing department was having a bad day or there was a thumbprint on the disk surface. But let's face it... just one tiny computer error could give you a bum steer.

What you need is a way to cut your possibility of error to a minimum. And the best time to start is the next time you order flexible disks. Just specify the BASF Flexydisk I

We make our Flexydisks a lot better than they have to be. Each one is 100% certified, and pre-formatted for immediate use. Flexydisks have a clean, debris-free surface like our premium 2000/A.D. computer tape. A special dual-purpose coating gives increased disk and head life. Our tests have shown head wear to be less than 23.5 micro-inches in 92 hours of head-loaded operation.

To keep time and use from taking their toll, we protect our Flexydisks in a special self-cleaning jacket and liner. This little packaging extra cuts down on friction and the possibility of errors.

One more point. Flexydisks cost no more than the competition's. You're already paying for BASF quality... you might as well have it. For more intriguing facts about Flexydisk I, write to BASF Systems, Crosby Drive, Bedford, Mass. 01730.

When it's BASF...you know it's

not the disk that goofed.

Multiprogramming System Cuts Billing Time in Half

SAN FRANCISCO — A small computer system designed for industrial distributors slashed invoice preparation time in half and accounts receivable aging from four days to 20 minutes for a Northern California distributor firm.

Furthermore, the system with its multiprogramming capabilities permits distributor personnel to use a variety of applications — such as payroll, invoicing, inventory control and sales analysis — concurrently on their dedicated devices.

The user is Hercules Standard Gasket Co. (HSG) of Berkeley, Calif., which lends increased flexibility to its choice of operating software. The System Ten computer is also helping to reduce the firm's billing and accounting costs, Dennis A. Metzinger said.

When the System Ten replaced the former billing and accounting machine operations, HSG received an immediate 50% savings in personnel assigned to invoicing, he said. "And the system requires two workstation operators instead of four to run billing and accounting programs to produce 3,500 invoices a month in half the time.

"But that's only half the story . . . it's true that the system saves us time and money on the jobs we used to handle with billing and accounting machines, but more importantly, it enables us to tackle bigger assignments that we just couldn't afford to do before," Metzinger said.

The Small Systems User

On a typical day, HSG's two CRT terminal operators devote most of the morning to invoicing, but the afternoons are usually free for entering payables, cash receipts, new account data, credits and inventory items.

"We now have fewer errors because our report cycle time has been reduced, and thus fewer customer complaints are received," Metzinger explained.

"Because it's not necessary to batch jobs, the computer gives us great flexibility to move at random from one application to another," he continued. "In addition to invoices, we produce monthly statements, payroll checks and reports, inventory control reports with quantities, locations and sales comparisons versus last year's results, vendor listings, salesman productivity reports and a customer master listing that includes name, address, account number, when the account was opened, its activity and current monthly billing."

Most of the firm's revenues continue to be derived from its distribution operation of over 6,000 industrial rubber products.

In addition, the gasket division manufactures and sells industrial gaskets of all types and materials that are produced to exacting job order specifications.

The integrated recordkeeping functions provide important coordination when fulfilling major contracts, Metzinger noted. For example, when HSG installed 55 of the world's largest rubber gaskets (oval-shaped 24 feet by 48 feet and weighing 8,000 pounds each) in Bay Area Rapid Transit's Transbay Tube, almost all of the company's resources were called upon to meet its contract commitments.

HSG installed a System Ten with a 30K processor, two Model 40 disk drives with 20M characters of storage, a Model 50 line printer and two Model 70 workstations in April 1971.

'Softwareless'

The System Ten operating system is "softwareless" with operating control vested in the central processor's arithmetic and control unit, which exercises a continuous "round-robin" priority discipline over memory partitions.

Essentially each area is sequentially allotted up to 37.5 msec of processing time prior to control being branched to the next or host partition. The effect is continuous and simultaneous processing of unrelated programs and input/output from various workstations or terminals.

An operator calls up a program by depressing an appropriate key. Main memory user partitions are associated with specific input/output devices and access programs called in from peripheral disk storage drives.

A System Ten equipment package, similar to the one in use at Hercules Standard Gasket, may be leased for about $2,300/mo or purchased for approximately $87,000.

Xerox 530 Eliminates 'Solo' Night Plotting

Special to Computerworld

LA CROSSE, Wis. — Frustrating experiences with a graph plotter running unattended at night played a part in Trane Co.'s decision to find a computer replacement at the company's Engineering Computer Center here, according to the center's manager, James R. Wright.

"With the previous computer, we either had to dedicate it to one of our plotters, at the expense of all of our other work, or run the plotter from data stored in disk memory," said Wright. "The latter required more disk and writing a spooling program. And either way, we could only run one plotter at a time."

Trane took a third option, which Wright recalls with the trace of a shudder. "We regularly ran our plots at night, even though we didn't have a night operator. We just loaded up the information and ran the computer solo. Sometimes things went wrong, and when we came to work in the morning we found a shredded mass on the plotter."

The Xerox 530 computer system Trane finally ordered last year has the theoretical capacity to drive not two but 64 plotters in the foreground while simultaneously performing background batch processing.

"That's considerably more plotting power than we'll ever need," Wright said, "but it's nice to know it's there. Especially because we're already planning to add a third plotter later this year."

Graph plotting, however, is only one small part of the workload of the new 530 computer, according to Wright. "This is our engineering computer," he said, "and we look on it as a tool for every engineer to use. And they're doing just that."

Jobs at the Engineering Computer Center, which lends support to 15 heating and cooling equipment plants here and abroad, fall into five major categories: reduction of laboratory test data, product design including automated drafting, producing media for numerically controlled machines, producing punched paper tape for Trane's automated typesetting equipment and developing engineering sales aids.

"At present we're processing over 300 jobs a day for approximately 60 accounts," said Wright. "And we're keeping both of those plotters busy during the day, with no need for that late night plotting."

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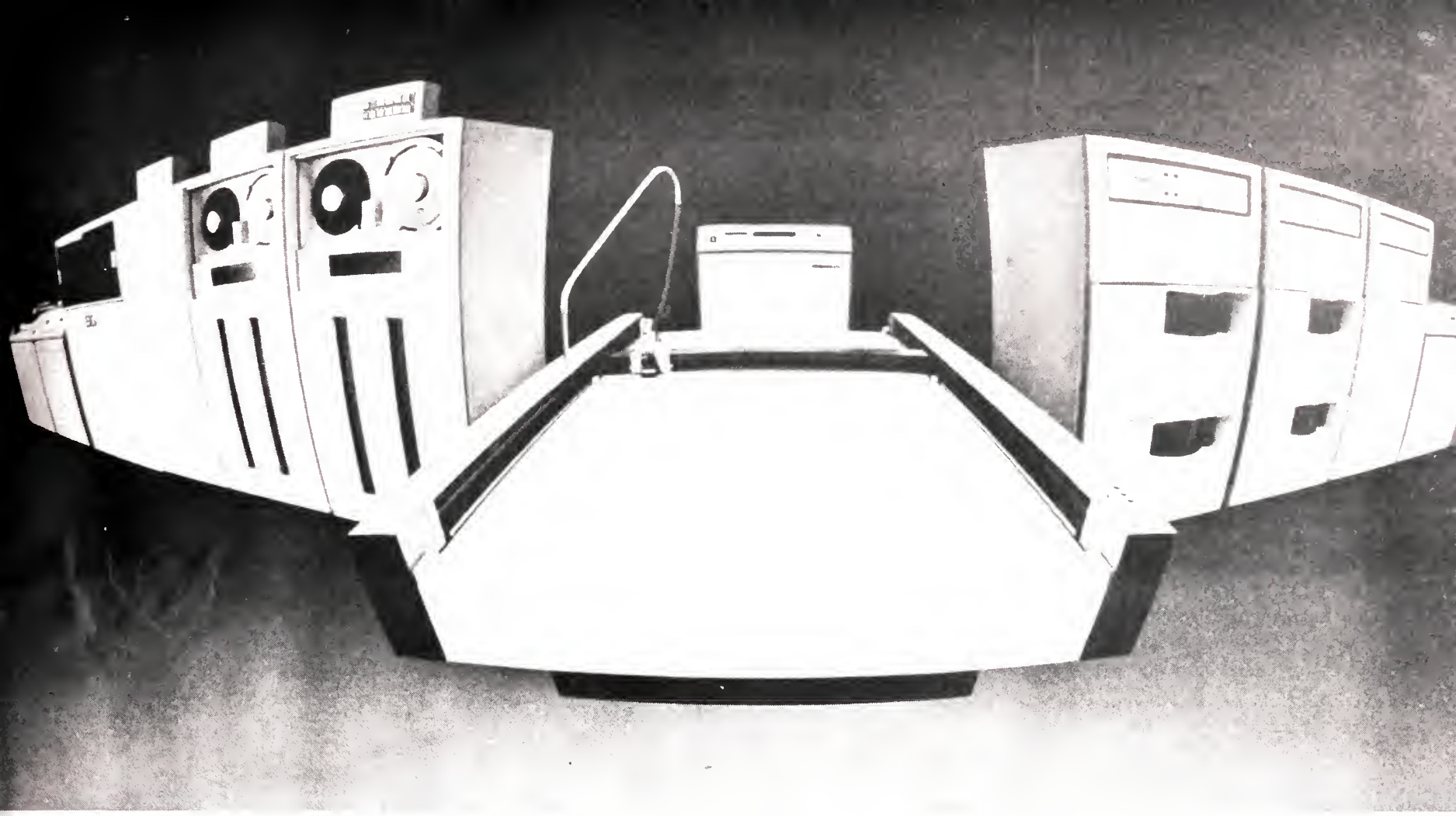

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ACM Budget Has $94,000 Surplus

CHICAGO -- The Council of the Association for Computing Machinery (ACM) has approved a budget for fiscal year 1975, with a surplus of approximately $94,000, restoring in whole or in part programs eliminated or reduced for financial reasons in 1973, according to Anthony Ralston, ACM president.

Societies/ User Groups

Meeting here recently, the council also authorized updating "Curriculum 68 -- Recommendations for Academic Programs in Computer Science," and announced a projected surplus from overall ACM operations of $300,000 by the end of the fiscal year.

It also authorized the president to proceed with implementing a joint membership agreement with the Australian Computer Society, adding to the previously approved international joint membership agreements with the German, Israeli and Italian computing societies.

Publications board chairman John Gosden was authorized to proceed with the publication of a new technical journal to be known as "ACM Transactions on Mathematical Software." John Rice of Purdue University was named editor-in-chief, and Lloyd D. Fosdick co-editor for algorithms, with the initial volume scheduled for publication in early 1975.

Society Sundries

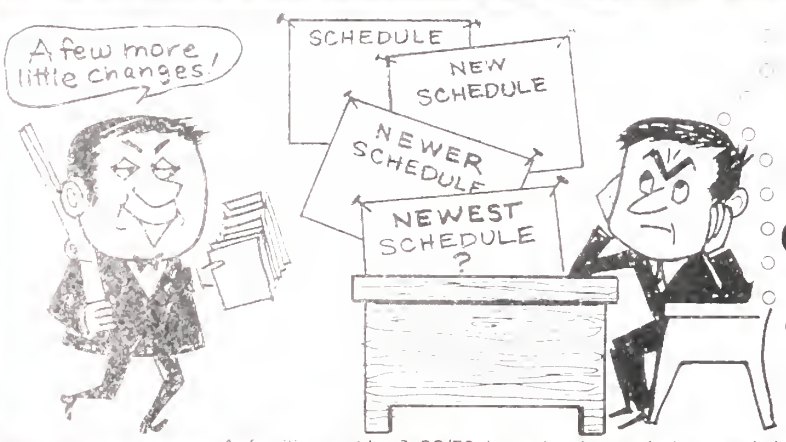
Dr. Kenton E. Ross, professor of accounting, Oklahoma State University, has been elected international president of the Association for Systems Management. Dr. James R. Gunderman, Meridian Insurance Companies, is the international president-elect.

— — —

The IEEE Computer Society, sponsor of the Special Awards in Mathematics and Computer at the International Science and Engineering Fair, has selected three winners. They are: "A Life-Game Computer," by Kreg A. Martin, Peterson High School, Santa Clara, Calif.; "A Physics Problem Solver," by Gregory Fenves, Mt. Lebanon High School, Mt. Lebanon, Pa.; and "Digital Logic Simulator and General-Purpose Computer," by Brian A. Pearsall, Montrose High School, Montrose, Colo.

— — —

The Univac Scientific Exchange has elected its officers for the coming year. Robert Lees, Sperry Univac Computer Center, Ontario Hydro, is the new president and chairman of the board of governors and Manly Draper, University of Wisconsin, succeeds Lees as vice-president.



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If you're now involved with data communications (or will be soon), this unique seminar will teach you what you need to know about this complicated area.

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The total cost for this two-day seminar is $350, including workbook, reference materials, year-long update service, luncheons and continental breakfasts. This cost does not include hotel rooms, if necessary.

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On-line CRTs Can Improve Library Service

CHICAGO – On-line CRT terminals accessing a central data base can both cut library costs by simplifying catalog work and improve service by quickly indicating which libraries are carrying a particular book, Frederick G. Kilgour, executive director of the Ohio College Library Center (OCLC), said recently.

OCLC serves about 150 institutions in Ohio and 11 other states, Kilgour said. In April, he mentioned, participating libraries cataloged 130,501 books through OCLC's automated system.

First Three Letters

The cataloger at the remote library site keys in the first three letters of the book title's first word, and the first letter of the next three words, disregarding English articles.

This calls up either a "catalog" of a maximum of about 50 titles, or in some cases, an individual record with the libraries that carry the book listed at the bottom.

In the case of the catalog of records, the remote library's cataloger can select one title and have its full bibliographic record displayed. By pressing two buttons when he sees the record he wants, the cataloger can make the OCLC system in Columbus produce a set of about seven catalog cards that match his library's formats.

OCLC sends the remote library the set of cards, which go into its public and administrative catalogs.

The cataloging set costs an Ohio library $1.69 plus 3.4 cents per card, Kilgour said. This charge pays for the terminal in the remote library, communication costs and OCLC's staff and computer.

Books Carried

Librarians can also use the system to tell library patrons which libraries are carrying a particular book. However, the system does not tell the user if the book has been checked out. Kilgour noted. There are about 900,000 book titles listed in the system, he mentioned.

OCLC went on-line with its first library in 1971, Kilgour said. Monthly telephone costs now come to $30,000, and OCLC is planning to add a Xerox Sigma 9 to its 64K-word Xerox Sigma 5 processor.

OCLC is not yet entirely self-supporting, Kilgour said, but he expects it to be soon. The center's budget for next year includes 6-1/2 R&D positions paid for by grants.

DP 'Holds Up' Penal Reform Bill

FRANKFORT, Ky. – A computer system foul-up here has delayed action on a massive penal reform bill.

The system, used by the Legislative Research Commission (LRC) to draft bills and committee substitutes for bills, managed to detain the penal code proposal for several days.

The House Judiciary Committee which drafted the bill became suspicious when the measure did not appear for the customary three readings and house floor vote.

One representative sponsoring the measure said, "Rules Committee hasn't killed the penal code bill; it's the computer that's sitting on it."

"We encountered no particular technical or DP problem in handling the penal code bill," commented Steve Globash, DP manager for the LRC system. "Ours was a procedural or 'infancy-system' problem that related to several bills."

Apparently, LRC established its system, running remotely on a state computer facility, just three months before this year's legislative session began.

"We didn't allow enough time to develop the procedures we needed and wanted," Globash said. "All it took was a bill of the size and complexity of the penal code to uncover our need for more organization."

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CI Notes

DEC Sues California Data

MAYNARD, Mass. – Digital Equipment Corp. has filed suit in the U.S. District Court of Los Angeles charging California Data Processors, Inc. with patent and trademark infringement.

The suit alleges the manufacture, use and sale of certain models of California Data's CDP-XI computer violates Digital's patent, specifically the PDP-11 family of minicomputers.

A spokesman for California Data stated his company had not been served with any papers and had not been informed of the suit.

Rockwell Gets Bubble Award

ANAHEIM, Calif. – Rockwell International Corp.'s Electronics Research Division has been awarded a Nasa contract to develop a 100,000-bit bubble domain memory device for use in future spacecraft data recorders.

The award, from Nasa Langley Research Center, calls for bubbles four microns in size providing a data density of 2.5M bit/sq-in.

Modcomp Lands $1.8 Million Order

FORT LAUDERDALE, Fla. – Modular Computer Systems (Modcomp) has received a $1.8 million contract from the Jet Propulsion Laboratory (JPL) for 26 Modcomp II computer systems.

Seventeen of the computer systems will be used in a network control system for JPL's deep space probe programs.

Burroughs Licenses Panaplex

DETROIT – Burroughs Corp. and General Instrument Co. have signed a license agreement which permits General Instrument to manufacture, use and market multidigit gas discharge panel displays such as Burroughs' Panaplex displays.

Burroughs is currently negotiating panel display license agreements with a number of other companies in the U.S. and overseas.

Supershorts

NCR field engineers will provide maintenance service for Applied Digital Data Systems, Inc.'s display terminals.

– – –

Data Electronics, Inc. has recently been established to manufacture and market small tape drives for the peripheral OEM computer market. The firm is at 370 N. Halstead St., Pasadena, Calif. 91107.

– – –

Econocom, Inc. has sold a used IBM 370/165 system to Air Products and Chemicals Corp.

– – –

Interdata, Inc. has appointed Protea Pni (Pty.) Ltd., Johannesburg, as exclusive sales and service representative in South Africa.

'Not Merely Enhancement'

SDLC Seen Impacting Many TP Markets

By Saroj K. Kar
Special to Computerworld

The Synchronous Data Link Control (SDLC), the oncoming full-duplex teleprocessing procedure from IBM, is certain to affect the teleprocessing industry significantly.

It opens up new markets for a wide range of communications products and is much more powerful than its predecessor, Binary Synchronous Communications (Bisync).

Most affected by this new teleprocessing technique will be the manufacturers of teleprocessing system components such as intelligent terminals, interactive and real-time systems, communications controllers, concentrators, modems, multiplexers and semiconductors.

SDLC is designed with program-controlled hardware in mind. Designing for SDLC would require thoughtful and thorough homework with regard to the architecture of the software, hardware and characteristics of the components to work with it.

SDLC is a wholly different animal from Bisync. Except that both use synchronous transmission, they show hardly any similarity. Line control, handshaking sequences and block formats are entirely different.

Those who think the present Bisync product lines can be converted with "adjustments" in the hardware and software are in for a real surprise.

A unique feature of SDLC is its "code independence" and inherent transparency capability. This code independence opens up the possibility of operating "multicode" systems where devices using different codes can cohabit the same link.

SDLC reflects a new outlook toward the role of procedure in teleprocessing. Its prime responsibility is viewed as conveying data between two points in a link with maximum speed and integrity and leaving the address and text processing to the main system.

SDLC may be operated in asynchronous (start-stop) mode as well. SDLC is basically speed-insensitive and can be operated on existing communications facilities.

With proper system design, it is possible to achieve nearly twice the throughput rate compared with Bisync.

Of all the markets affected by SDLC, intelligent terminals and communications controllers would be impacted first. SDLC requires a different system design approach for both hardware and software.

Basically the system would use program-controlled hardware, and program here implies both microprogram and macroprogram. SDLC-compatible adapters would have to be designed.

(Continued on Page 34)

Viewpoint

Sanders Deplores Teale 'Secret,' Gives State Suggestions for RFPs

By Molly Upton
Of the CW Staff

SACRAMENTO, Calif. – Sanders Associates has submitted a paper to the California Assembly Ways and Means Committee with suggestions on how to conduct future procurements.

The paper also highlights Sanders' discovery of a "secret" condition in the RFP (Request For Proposal) for the Teale Center that required independents' bids to be 10% less expensive than those of mainframe suppliers.

The suggestions are intended to help "cure" what Sanders sees as a built-in bias by the state in its bidding procedures.

Sanders, a bidder for CRT terminals in the Teale contract, registered and then withdrew a protest with the state on its evaluation procedures.

The Sanders paper urged the legislature to use its "purchasing power to effect the most cost-effective buys for the state. Recognize the utility of buying by subsystem components. Implement standards which do not preempt federal standards, but which complement them, and which are mandatory for state DP purchases.

"More specifically, build into your procurement regulations the requirement that certain families of interface standards be mandatory at each installation . . . Force unbundling in subsystem and component areas, as well as software," the paper continued.

If the mainframe supplier is to act as project manager, "make it mandatory that he enter into subcontracts with qualified responsible vendors for subsystems which are demonstratively more cost-effective," Sanders suggested.

"Under no circumstances, allow a condition such as the 10% disability we encountered to become part of an evaluation for any DP installation," the paper continued.

Low Bid

Sanders recounted how it understood the bidding to be open to subsystems vendors, and had submitted a bid for under $1.9 million, versus IBM's $2.3 million.

Ira Isbell, director of Teale, testified Dec. 17 before the Ways and Means Committee that "while Sanders was somewhat lower in price, it was not significantly lower, and therefore had not been qualified," according to the Sanders paper.

In reading the "final" Evaluation and Selection Committee report, dated Nov. 29, 1973, Sanders "was dumbfounded at the discovery of the fact that secretly the evaluators had built-in a condition which required Sanders, or other subsystem suppliers, to be 10% better in price than the so-called system houses selected to provide the mainframes, and also to perform the project management and conversion services.

"This was incredible," Sanders told the committee in its paper.

Dartmouth, Honeywell Asked To Drop Marketing Agreement

MONTVALE, N.J. – The Association of Data Processing Service Organizations, Inc. (Adapso) has leveled a warning against Honeywell, Inc. and Dartmouth College saying it believes the two organizations may be violating federal and state antitrust laws and federal tax laws.

In sharply worded mailgrams to Honeywell, Dartmouth and its subsidiary DTSS, Inc., Adapso asked the college and Honeywell to "discontinue all joint arrangements for the marketing of Honeywell computers and Dartmouth software." It also requested Dartmouth to "completely sever all commercial activities engaged in through DTSS and Honeywell, including their use of college facilities, personnel, resources and privileged status and the technical systems developed by the college."

The agreement between Honeywell and DTSS involves a joint referral agreement.

DTSS executive vice-president Robert Hargraves denied the charge, claiming the cost of developing the Dartmouth software would have been the same if developed by commercial organization.

DTSS is incorporated as a non-profit corporation, and enjoys no privileges in its dealings with the college, he said.

"When a private firm goes into development, research and marketing, it's taxable from the beginning to end," countered Jerry Dreyer, executive vice-president of Adapso.

A Honeywell spokesman said, "A preliminary determination is that the allegations are without merit but our legal department is continuing to look into the matter."

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Wescon DP Booths Sold Out; Minis Dominate

LOS ANGELES – The computer area of the 1974 Western Electronic Show and Convention (Wescon) is already sold out with about 70 booths, according to show organizers, who report the exhibit will be larger than last year's.

Most of the booths in the DP area are taken by firms exhibiting minis and peripherals. Wescon will be held at the Convention Center here Sept. 10-13.

The show, which is 95% booked, is expected to total 537 booths compared with last year's 466 booths, and organizers anticipate attendance of around 30,000.

Officials expect a final exhibitor count of 280. Each exhibitor will fill an average of two booths, a slight increase in exhibit occupancy over previous shows.

The Wescon professional program will consist of 26 to 28 half-day sessions, beginning at 10 a.m. and ending at 2 in the afternoon.

Six additional sessions are being planned by members of the program committee.

The program promises four sessions dealing with microprocessors.

Other session topics include:

- Advances in CCD memories.
- What to Do If the Lights Go Out – The Uninterruptible Power Story.
- Computer Security/Privacy Systems.
- Needs and Trends in Medical Electronics – 1974.
- Taking Your Technology to New Markets.
- The Real World of Digital Communications.
- How to Prepare an Effective Business Plan to Raise Capital.

The 1974 Wescon is presented by Electronic Representatives Association (Northern and Southern California Chapters) in partnership with the IEEE Los Angeles Council and IEEE San Francisco Section.

Impact on Designers

SDLC Seen Becoming Industry Standard

(Continued from Page 32)

In software, telecommunication and data processing must be viewed as separate and autonomous responsibilities, even though they would normally reside within the same operating system. Some systems are expected to use separate "SDLC boxes" with interchange of "polished" data blocks between the host and the SDLC box.

Some systems will adopt the ICA approach (Integrated Communications Adapter, available for 370/135). The SDLC set of cards will reside within the mainframe's cage, function autonomously and share memory with the CPU through "cycle steal."

The system design must be adaptable to inevitable changes in the SDLC, although SDLC is expected to reach maturity much sooner than Bisync.

SDLC can be operated on practically any type of line, and will create a lucrative market in terminals and controllers for low-cost modems specially designed to optimize the advantages of SDLC. The independent modem industry has matured sufficiently to do so within a short time.

SDLC is very well-suited to specialized integrated circuit components. Consequently, a large market will develop for specialized LSI and MSI components for SDLC.

The packet switching companies are expected to adopt SDLC rapidly.

IBM has paved the way firmly and definitely for SDLC, which is expected to become the norm for the industry, just as Bisync has been.

Because of IBM's vigorous push for SDLC, the independents soon may not have any choice but to join in the move and adapt their products as soon as possible.

The aggressive manufacturers of teleprocessing systems and components who realize the impact SDLC will have should become active in the SDLC products without losing any further time. IBM is bound to face much tougher competition much sooner in SDLC than it did with Bisync.

Saroj K. Kar is with Telecom Computer Technology, Sunnyvale, Calif.

Memorex Cuts 125 Middle Managers

CW West Coast Bureau

SANTA CLARA, Calif. – To streamline management and save $4 million a year, Memorex Corp. has decided to fire 125 middle-management personnel.

The cutbacks are the first major move by the new Memorex president, Robert C. Wilson, who joined the company on May 15.

The cuts affect the entire Memorex operation from manufacturing, engineering and marketing to accounting, and most of the jobs involve supervisory personnel, a Memorex spokesman said.

"By removing some layers of management, we have shortened lines of communications and made for greater productivity and better decision-making," the spokesman said.

At the same time, the company also announced plans to separate Memorex's international operations from its equipment products group. The international operations will report to Wilson.

The new cutbacks are not expected to produce the full savings until 1975, a spokesman said. It will not affect production workers.

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CMC Buys Remcom Base Of Remote Batch Systems

CW West Coast Bureau

LOS ANGELES – Computer Machinery Corp. (CMC), supplier of shared processor data entry systems, has gone full speed into the remote batch processing market by taking over Remcom's installed base of 500 systems.

In deals with Transamerica Computer Corp. and Inleasing Corp. (ILC), CMC agreed to maintain and manage the systems.

CMC also acquired from Transamerica the rights to manufacture Remcom systems.

The Transamerica agreement is expected to be finalized soon, a CMC spokesman said. The ILC agreement has been completed.

Thomas L. Ringer, CMC president, said the new installations will increase CMC's remote batch base tenfold.

Initially, it will add approximately $5 million in annual recurring revenues.

CMC had revenues of $53 million in 1973 and an installed base of 800 to 900 of its shared processor systems worldwide.

It also has installed about 50 remote batch systems of its own which it began marketing last July as Telebatch Data Communication Systems.

Transamerica took over ownership of 300 of Remcom's systems in February when Remcom's parent SCS Corp. of Dallas went into Chapter XI bankruptcy.

CMC will lease 150 systems owned by Inleasing and will be assigned another 50 units which are already leased to end users.

CMC will also service systems owned by end users.

The agreement increases CMC's field service organization from 70 to 85 offices with the absorption of Remcom's offices and personnel in the U.S. and Canada.

Transamerica and CMC will share the profits of the leasing revenues.

In addition, Transamerica will get a 5% license fee on all new Remcom systems CMC manufactures.

CMC will also pay Transamerica for manufacturing parts in inventory as they are used up.

Three Models

Remcom made three models of remote batch processing systems. They usually consisted of a card reader, output printer, controller and sometimes a computer. Leases ran from $800 to $1,200 a month.

Ringer said the deal will "firmly establish us in a market directly related to our present business. We instantly gain a position it might otherwise have taken years to achieve.

"We acquire a line of quality products that is profitable today and has excellent growth potential. And we increase our customer base by about 25%," he said.

Transfer of manufacturing facilities in Dallas to Los Angeles is being considered, he added.

The manufacturing capacity is now about 25 systems a month but CMC expects to turn out about 100 a month.

Study Foresees Boom in Minis

CAMBRIDGE, Mass. – The market for multipurpose business data processing systems utilizing minicomputers will reach $2.2 billion according to a recent report prepared by Arthur D. Little, Inc.

Norman Zimbel, director of ADL's study of the "Outlook for Minicomputer-Based Business Systems," stated, "This largest segment of the market for minicomputers will continue to grow at the rate of better than 15% annually and selected portions at better than 25%.

"The minicomputer shows promise of coming into its own in newer application areas related to business communications – text-processing systems and private branch exchange systems (PABX), with strong market growth predicted in the late seventies."

The "flexibility and comparatively low cost" of the minicomputer make it an attractive cost-effective alternative to large-scale data processing equipment, he said.

The ADL study examines the changes occurring in product characteristics, industry participant relationships and growth in markets for business-oriented applications. The study costs $2,500 from the firm at Acorn Park, 02140.

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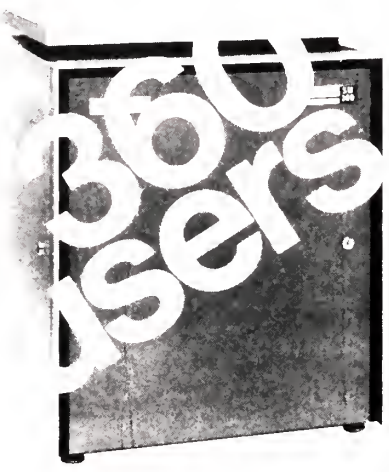

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NCR's 'Vocational Marketing' Geared to User Area: Anderson

By Pat Ward
Of the CW Staff

CINCINNATI – NCR's vocational marketing approach fits in with the company's ability to deliver complete information processing systems to different groups of users, President W.S. Anderson told the Federation of NCR Users annual meeting here.

"Vocational marketing" simply consists of assigning salesmen and support people to serve "specific types of markets rather than having them organized to sell specific lines of products," Anderson told the group.

The marketing change is part of phase 2 of NCR's "corporate rebuilding program," which also includes an effort to improve the company's responsiveness to changing product and systems requirements, and to integrate domestic and international operations into a "total worldwide company."

Phase 2 could not get off the ground without the company's recent strong financial performance, Anderson commented.

Better Service

The new marketing strategy means salesmen and systems analysts specializing in the problems of a given industry will be better equipped to serve NCR customers, he noted.

Similarly, the marketing approach means one NCR salesman or a team will likely replace several different salesmen handling different product lines.

Anderson admitted "we lost some business during the initial shakedown period of this reorganization." Marketing men have been switched from their old accounts and most are operating in new territory.

This year NCR will be giving 61,000 man-days of training in the sales and support area, compared with 27,000 the year before.

To bolster responsiveness to customer needs, the company plans to spend $60 million on R&D this year compared with $52 million last year, and the company has reshaped its R&D structure to get more for its money, Anderson said.

Anderson noted NCR's quality assurance program has produced gratifying results and user surveys indicate "the products we are shipping today are the most trouble-free NCR has ever manufactured."

Future Happenings

As for the future, Anderson noted, the company has established a Special Systems Division in San Diego, specializing in the development, installation and support of large customized on-line systems using currently available NCR gear.

Also, NCR's liaison with Control Data Corp. "will provide both companies in the not-too-distant future with fully integrated, new generation computer lines ranging all the way from low-cost systems for the smaller user to very large systems, which will exceed in processing speed and power anything currently available in the industry," he said.

To become a "comprehensive systems company," NCR will need good general software and well-conceived applications packages, Anderson continued.

To obtain this, NCR is relying on both its own in-house capability and also on outside software development organizations which could develop the product "within more desirable timeframes than we could meet internally," he said.

The user group's Software Advisory Committee won Anderson's praise for "excellent input" and for serving as an effective sounding board for company proposals.

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This course will acquaint the programmer with a wide range of practical programming skills which he would not receive in a "basic" training course offered by most hardware manufacturers, industrial training organizations or computer science courses. The intention is for the student to leave the course with practical ideas that can readily be applied in his day-to-day work. The advanced techniques presented in this course are applicable to any computer installation using any of the major programming languages.

The course consists of two major segments: how to design a good computer program, and how to make use of advanced techniques for program implementation. The student learns these techniques and concepts through a combination of intensive lectures, discussions, programming exercises and case studies.

The first part of the course concentrates on various topics in the area of *program design*. The student is given specific techniques for designing programs in a top-down fashion; for writing modular programs; for writing structured programs; for writing programs that can be understood by others. The second part of the course concentrates on a variety of *implementation techniques*. Included in the discussion are optimization techniques, data structures, dynamic storage allocation, decision tables, testing and debugging techniques, and searching techniques.

COURSE MATERIALS include the 550-page draft manuscript, *Program Structure and Design* and the 350-page manuscript, *Techniques of Programming*, both by Edward Yourdon. Copies of approximately 450 slides and visuals used to support the text material will also be provided.

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This course teaches the concepts and techniques with discussions, lectures, case studies, a major programming exercise and workshop sessions. Specific rules and conventions are established. With this practical experience, the student should immediately be able to apply the principles of top-down design and structured programming.

COURSE MATERIALS include a copy of the 550-page draft manuscript, *Program Structure and Design,* by Edward Yourdon. Copies of approximately 200 visuals and slides will also be provided.

REGISTRATION FEE for each seminar, including all course materials and luncheon, is $600. Payment is due prior to the beginning of the seminar. Enrollment is limited to preserve the integrity of the course and to assure effective instruction; prompt registration is recommended to guarantee space availability.

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THIS AD IS NOT A SOLICITATION FOR BIDS

The purpose of this notice is to solicit the names of those firms interested in receiving invitations for Bid. The state of California maintains a central vendors list for EDP equipments in the Department of Finance, EDP Control & Development Division. All firms seeking to be considered or wishing to receive invitations for bids for the above noted peripherals replacement procurements should forward a letter indicating such interest to:

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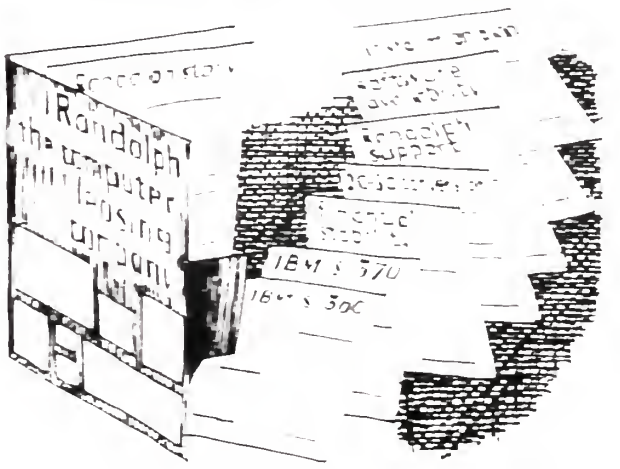

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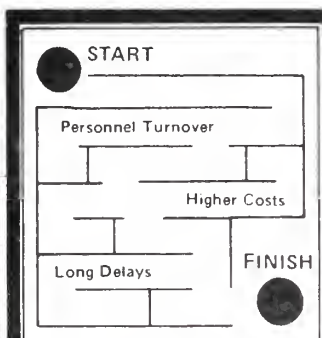

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Potter Reduces Third-Quarter Losses

PLAINVIEW, N.Y. – Potter Instrument Co., Inc. reduced its third-quarter losses and turned in earnings of $1 million in the nine months, in contrast with a loss in the same period a year ago.

In the quarter, the peripherals maker lost $616,720 or 22 cents a share compared with a loss of $787,200 or 28 cents a share in the year-ago period.

Revenues rose 18% to $12.8 million from $10.9 million.

For the nine months, revenues climbed 12% to $39.3 million from $35.2 million in the 1973 period.

Earnings of $1 million or 37 cents a share include a tax credit of $483,221 or 18 cents a share and compare with a loss of $420,676 or 15 cents a share in the year-ago period.

Includes Royalties

The revenues of both periods include royalties amounting to $37,500 and $240,501 in the 1974 and 1973 quarters respectively and $112,500 and $2.3 million in the nine months.

The recent nine month revenues also include $1.8 million representing the excess of contractual payments received over the amount allocated to future development work, Potter said.

Memorex Posts Loss

SANTA CLARA, Calif. – Interest expenses of $5.5 million consumed all of Memorex Corp.'s operating income and resulted in a $5,000 loss for the first quarter ended March 31.

Revenues for the period rose 16% to $48.8 million from $41.9 million in the year-ago period.

The firm has made an agreement in principle with its senior lenders that would lower debt service through a number of revisions on credit agreements {CW, April 10}.

Scan-Data Quarter Earnings Soar; Revenues Increase 20% in Period

NORRISTOWN, Pa. – Scan-Data Corp.'s first quarter earnings soared as revenues jumped 20% in the period ended March 31.

Earnings leapt to $30,636 or 2 cents a share, including an $8,205 tax credit, compared with earnings of $1,849 in the year-ago period.

Revenues reached $1.9 million compared with $1.6 million in the same 1973 period.

President Robert R. Burns noted that 1974 is a year of "marketing emphasis" at Scan-Data, adding the firm's offerings include a stand-alone key-to-disk system as well as a mixed-media optical character recognition and disk system.

Results for the year ended Dec. 31 were "very close to plans made early in the year – to increase revenues and gross profit margins substantially, while holding operating expenses essentially level with the prior year," Burns said.

The firm earned $92,996 or 6 cents a share, compared with a loss of $1.4 million in the previous year.

There was a $38,000 tax credit in 1973 and a $259,000 charge for cumulative effect of change in accounting for deferred marketing and installation expenses.

Revenues for the year rose to $7 million from $4.7 million.

Inforex Loses $92,000 in Quarter

BURLINGTON, Mass. – Despite increased revenues, Inforex, Inc. recorded a loss of $92,000 or 3 cents a share in the first quarter ended March 29.

Although down from the fourth quarter loss of $618,000, the first-quarter loss compared with earnings of $813,000 or 29 cents a share in the year-ago period, when there was a $339,000 special credit.

Revenues rose to $10.8 million from $7.8 million a year ago. Rental and service revenues comprised $4.9 million of this quarter's revenues, compared with $3.4 million in the year-ago period.

The quarter's $5.6 million in other sales included substantial increases in revenue from foreign distributors, plus a higher level of installations of long-term leases, the company said.

There were no third-party sales in the quarter.

The results represent an improvement over the previous quarter, noted Chairman T.C. Cronin, who cited lower expenses in several areas.

Acquisitions

Kranzley & Co., systems development firm, has acquired Berglund Associates, Inc., a company providing consulting and technical services in the field of telecommunications.

TRW Inc. has completed a merger with Financial Data Seienees Inc., which will continue under its present management as an operating unit of TRW's electronics group.

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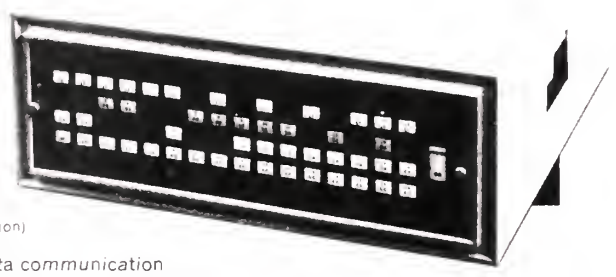

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Earnings Reports

NASHUA
Three Months Ended March 29

	1974	1973
Shr Ernd	$.68	$.56
Revenue	71,015,000	48,115,000
Earnings	3,117,000	2,540,000

SYCOR
Three Months Ended March 31

	1974	a1973
Shr Ernd	$.31	$.17
Revenue	9,343,100	6,032,700
Spec Cred	b335,000	d(1,730,800)
Earnings	853,000	(1,288,700)

a-Restated. b-From tax-loss carryforward. d-Consists of $2.1 million charge from an accounting change, less $330,000 credit from a tax-loss carryforward.

ELECTRONIC ASSOCIATES
Three Months Ended March 29

	1974	a1973
Shr Ernd	.....	$.26
Revenue	8,940,000	8,875,000
Tax Cred	.....	309,000
Earnings	(260,000)	697,000

a-Restated.

TALLY
Three Months Ended March 31

	1974	1973
Shr Ernd	$.05	.....
Revenue	4,153,734	3,098,662
Earnings	125,176	(335,185)

MILGO ELECTRONIC
Three Months Ended March 31

	1974	1973
Shr Ernd	$.50	$.49
Revenue	6,640,000	5,329,000
Earnings	784,000	787,000
6 Mo Shr	1.03	.93
Revenue	13,629,000	10,104,000
Earnings	1,621,000	1,491,000

CALIFORNIA COMPUTER PRODUCTS
Three Months Ended March 31

	1974	1973
Shr Ernd	a$.88	$.33
Revenue	34,686,000	21,340,000
Tax Cred	1,427,000	.....
Earnings	3,087,000	976,000
9 Mo Shr	a1.96	.....
Revenue	91,727,000	54,811,000
Tax Cred	3,047,000	.....
Earnings	6,693,000	(603,000)

a-Fully diluted.

ELECTRONIC ASSISTANCE
Year Ended Jan. 31

	1974	1973
Shr Ernd	$.37	$.15
Revenue	37,617,000	37,741,000
Disc Op	.....	(243,000)
Spec Cred	a202,000	20,000
Earnings	711,000	288,000

a-Tax-loss carryforward.

STORAGE TECHNOLOGY
Three Months Ended March 29

	1974	1973
Shr Ernd	a$.32	$.49
Revenue	16,234,000	11,334,000
Tax	.....	645,000
Earnings	1,130,000	1,689,000

a-Fully diluted.

MODULAR COMPUTER SYSTEMS
Three Months Ended March 29

	1974	1973
aShr Ernd	$.21	$.12
Revenue	4,956,000	2,200,000
Tax Cred	188,000	122,000
Earnings	591,000	252,000

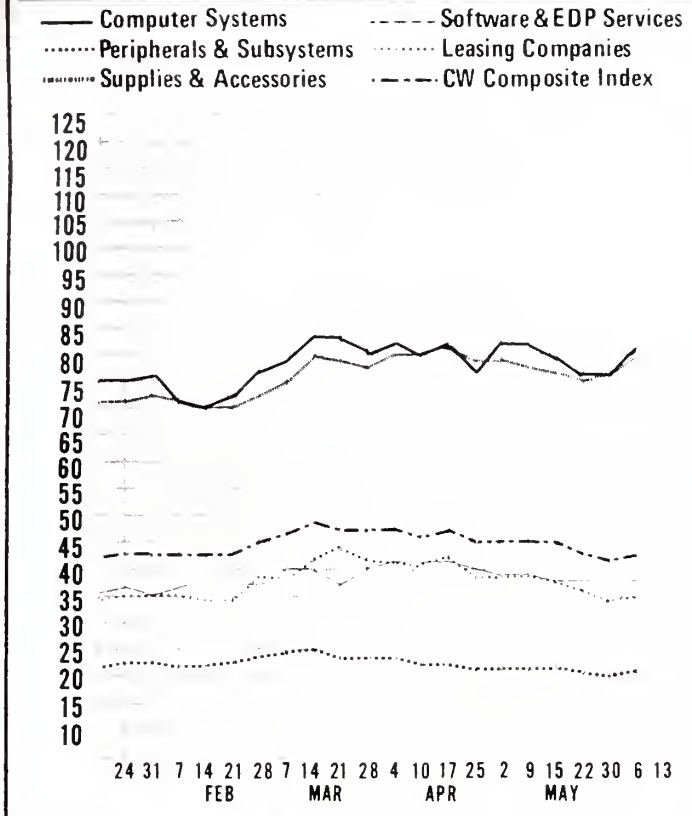
a-Fully diluted.

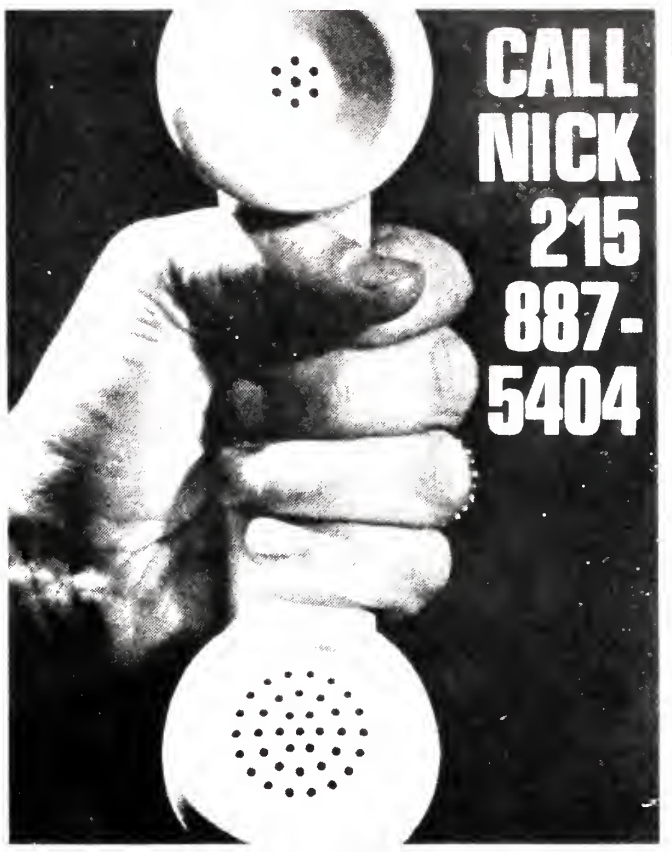
GRAPHIC SCIENCES
Three Months Ended March 31

	1974	1973
Shr Ernd	$.07	$.05
aRevenue	3,729,000	2,379,000
Disc Op	.....	71,000
bTax Cred	52,000	55,000
Earnings	201,000	140,000
9 Mo Shr	.22	.26
aRevenue	10,751,000	7,223,000
Disc Op	25,000	235,000
bTax Cred	220,000	279,000
Earnings	663,000	793,000

a-From continuing operations. b-From loss carryforward.

COMPUTERWORLD Computer Stocks Trading Indexes





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TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

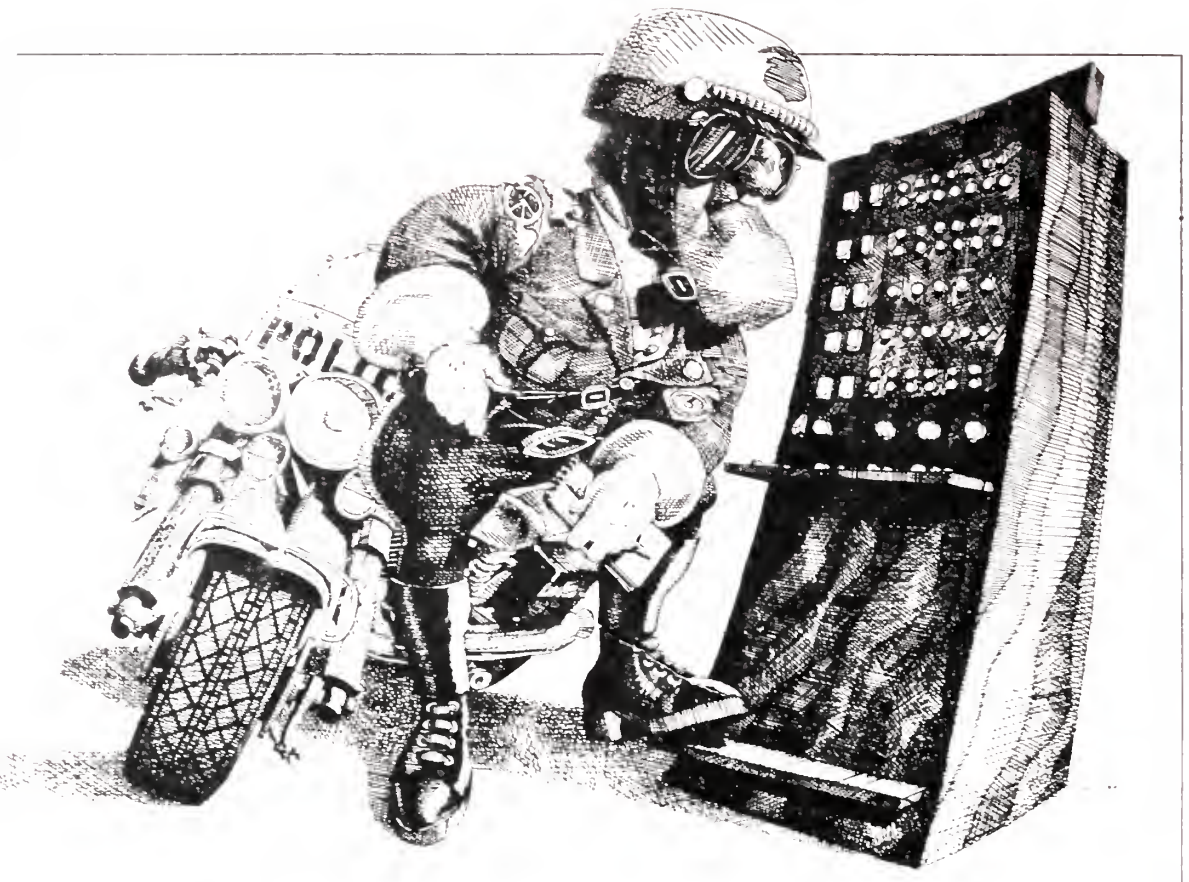
CLOSING PRICES THURSDAY, JUNE 6, 1974

E X C H		1973-74 RANGE (1)	CLOSE JUN 6 1974	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	49-126	109 1/8	+6 1/2	+6.3
N	COLLINS RADIO	16- 26	24 3/4	0	0.0
O	COMPUTER AUTOMATION	5- 20	13 3/4	+2 1/4	+19.5
N	CONTROL DATA CORP	27- 62	31	+3 5/8	+13.2
N	DATA GENERAL CORP	28- 49	35 5/8	- 1/4	-0.6
O	DATAPOINT CORP	10- 21	12 1/4	0	0.0
O	DIGITAL COMP CONTROL	2- 6	4	+ 1/2	+14.2
N	DIGITAL EQUIPMENT	73-121	110 7/8	-2 5/8	-2.3
N	ELECTRONIC ASSOC.	2- 9	2 1/8	+ 1/8	+6.2
A	ELECTRONIC ENGINEER.	6- 14	8 5/8	+ 1/2	+6.1
N	FOXBORO	23- 48	30	-1 1/4	-4.0
O	GENERAL AUTOMATION	22- 55	37	+1 3/4	+4.9
O	GRI COMPUTER CORP	1- 3	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	70- 99	88 3/8	- 7/8	-0.9
N	HONEYWELL INC	68-139	69 1/4	+1 1/2	+2.2
N	IBM	211-340	227 1/2	+13	+6.0
O	INTERDATA INC	7- 22	20 1/4	+1 1/2	+8.0
O	MICRODATA CORP	2- 10	3 5/8	+ 3/4	+26.0
N	NCR	27- 46	36	+2 7/8	+8.6
N	RAYTHEON CO	22- 39	33 1/2	+1 1/4	+3.8
N	SINGER CO	30- 74	32 1/4	+1	+3.1
N	SPERRY RAND	36- 56	41	+3 1/8	+8.2
A	SYSTEMS ENG. LABS	1- 8	1 7/8	+ 3/8	+25.0
N	TEXAS INSTRUMENTS	83-138	102 7/8	-7 1/8	-6.4
O	ULTIMACC SYSTEMS INC	1- 11	1 1/2	0	0.0
N	VARIAN ASSOCIATES	9- 20	9 1/2	+ 1/8	+1.3
N	WANG LABS.	11- 34	14 1/2	+1 3/8	+10.4
N	XEROX CORP	106-169	124	+7 7/8	+6.7
	LEASING COMPANIES				
A	BOOTHE COMPUTER	1- 5	1 1/8	0	0.0
O	BRESNAHAN COMP.	1- 2	2 1/8	0	0.0
O	COMDISCO INC	2- 17	2 3/4	0	0.0
A	COMMERCE GROUP CORP	3- 6	3 3/4	- 1/2	-11.7
O	COMPUTER EXCHANGE	1- 1	1/8	0	0.0
A	COMPUTER INVSTRS GRP	2- 8	1 3/4	0	0.0
O	COMR. INSTALLATIONS	1- 2	1	0	0.0
M	DATRONIC RENTAL	1- 3	1	0	0.0
A	OCL INC	0- 3	1/2	+	+14.1
N	OPF INC	3- 9	3 7/8	+ 1/4	+6.8
O	EDP RESOURCES	1- 3	3 1/4	0	0.0
A	GRANITE MGT	1- 6	1 1/4	0	0.0
A	GREYHOUND COMPUTER	3- 6	3 5/8	+ 1/8	+3.5
A	ITEL	4- 12	4 5/8	+ 3/8	+8.8
N	LEASCO CORP	8- 18	10 1/4	+ 1/2	+5.1
O	LEASPAC CORP	1- 8	1 1/8	- 1/8	-10.0
O	LECTRO MGT INC	1- 2	3/8	0	0.0
O	NRG INC	3- 15	3 5/8	+ 3/8	+11.5
A	PIONEER TEX CORP	2- 10	2 7/8	+ 1/2	+21.0
A	ROCKWOOD COMPUTER	1- 3	3/4	0	0.0
N	U.S. LEASING	12- 36	14 3/4	+1 1/2	+11.3

E X C H		1973-74 RANGE (1)	CLOSE JUN 6 1974	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	3/4	0	0.0
A	APPLIED DATA RES.	2- 4	2 1/4	- 1/8	-5.2
O	APPLIED LOGIC	1- 3	1/8	- 1/8	-50.0
N	AUTOMATIC DATA PROC	29- 94	32 1/2	- 1/2	-1.5
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	3- 9	4	+ 1/2	+14.2
O	COMPUTER DIMENSIONS	1- 5	2	0	0.0
O	COMPUTER HORIZONS	1- 6	2	- 1/4	-11.1
O	COMPUTER NETWORK	1- 5	1 3/8	0	0.0
N	COMPUTER SCIENCES	2- 6	2 7/8	+ 3/8	+15.0
O	COMPUTER TASK GROUP	1- 2	1/2	- 1/8	-20.0
O	COMPUTER TECHNOLOGY	1- 3	1/2	0	0.0
O	COMPUTER USAGE	3- 9	3	0	0.0
O	COMRESS	1- 2	1/2	+ 1/8	+33.3
O	COMSHARE	2- 9	2 5/8	- 1/8	-4.5
N	CORDURA CORP	2- 15	3 1/4	0	0.0
O	DATATAB	1- 4	2	- 1/4	-11.1
A	ELECT COMP PROG	1- 2	1/8	- 1/8	-50.0
N	ELECTRONIC DATA SYS.	12- 56	17	+ 3/4	+4.6
O	INFONATIONAL INC	1- 2	1/2	0	0.0
O	I.O.A. DATA CORP	1- 1	3/8	0	0.0
O	IPS COMPUTER MARKET.	1- 5	3/4	0	0.0
O	KEANE ASSOCIATES	2- 5	3 1/2	0	0.0
O	KEYDATA CORP	3- 12	3 1/8	- 1/4	-7.4
O	LOGICON	2- 7	3	0	0.0
A	MANAGEMENT DATA	1- 5	1 3/8	0	0.0
O	NATIONAL CSS INC	18- 42	23 1/2	+3	+14.6
O	NATIONAL COMPUTER CO	1- 1	3/8	0	0.0
O	NATIONAL INFO SRVCS	1- 2	1/8	0	0.0
A	ON LINE SYSTEMS INC	12- 31	28 1/2	+1 3/4	+6.5
N	PLANNING RESEARCH	2- 7	2 3/4	+ 1/8	+4.7
O	PROGRAMMING METHODS	17- 25	17	0	0.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	2- 24	2 5/8	0	0.0
O	SCIENTIFIC COMPUTERS	1- 3	7/8	0	0.0
O	SIMPLICITY COMPUTER	1- 4	1	0	0.0
O	TCC INC	1- 1	1/4	0	0.0
O	TYMSHARE INC	6- 13	11 5/8	+1	+9.4
O	UNITED DATA CENTER	3- 6	2 3/4	0	0.0
A	URS SYSTEMS	2- 8	2 1/2	+ 1/4	+11.1
N	WYLY CORP	3- 11	3 5/8	+ 3/8	+11.5
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	6- 34	5 5/8	- 5/8	-10.0
O	ADVANCED MEMORY SYS	3- 23	3 3/8	0	0.0
N	AMPEX CORP	3- 7	3 5/8	+ 1/4	+7.4
O	ANDERSON JACOBSON	2- 6	2 1/2	+ 0	0.0
O	BEEHIVE MEDICAL ELEC	3- 10	3 1/4	- 1/4	-7.1
A	BOLT,BERANEK & NEW	6- 12	8	+1 1/8	+16.3
N	BUNKER-RAMO	6- 18	6 1/2	+ 1/4	+4.0
A	CALCOMP	5- 16	10 1/4	+1 1/4	+13.8
O	CAMBRIDGE MEMORIES	8- 17	9 1/2	+ 1/4	+2.7
O	CENTRONICS DATA COMP	13- 38	19 3/4	+1	+5.3
O	CODEX CORP	8- 19	12 1/4	+1	+8.8
O	COGNITRONICS	1- 3	1 1/8	- 1/4	-18.1

E X C H		1973-74 RANGE (1)	CLOSE JUN 6 1974	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER COMMUN.	1- 4	1/2	- 3/8	-42.8
A	COMPUTER EQUIPMENT	1- 3	1 1/2	0	0.0
O	COMPUTER MACHINERY	4- 13	3 7/8	+ 1/4	+6.8
O	COMPUTER TRANSCEIVER	1- 6	1	+ 1/8	+14.2
N	CONRAC CORP	13- 32	16 7/8	+ 5/8	+3.8
O	DATA ACCESS SYSTEMS	1- 3	1 7/8	0	0.0
O	DATA 100	9- 19	10	+ 7/8	+9.5
A	DATA PRODUCTS CORP	2- 5	3 5/8	+ 1/4	+7.4
O	DATA RECOGNITION	1- 3	1/4	0	0.0
O	DATA TECHNOLOGY	1- 5	2 7/8	+ 1/8	+4.5
O	DECISION DATA COMPUT	6- 40	7 1/2	+ 1/8	+1.6
O	DELTA DATA SYSTEMS	1- 1	5/8	- 1/8	-16.6
O	DIZAN CONTROLS	1- 4	3/4	- 1/2	-40.0
N	ELECTRONIC M & M	3- 6	2 5/8	0	0.0
O	FABRI-TEK	2- 5	2 3/8	+ 1/8	+5.5
O	GENERAL COMPUTER SYS	2- 9	2	- 1/4	-11.1
N	GENERAL ELECTRIC	68- 76	69 1/2	+1 1/4	+2.5
N	HAZELTINE CORP	4- 9	4 5/8	+ 1/8	+2.7
O	INFOREX INC	2- 23	2 1/4	0	0.0
O	INFORMATION DISPLAYS	1- 2	1/4	- 1/8	-33.3
O	INFORMATION INTL INC	8- 15	11 1/4	+1 1/2	+15.3
A	LINDY ELECTRONICS	3- 9	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/4	0	0.0
N	MEMOREX	2- 19	3 7/8	+ 1/8	+3.3
A	MILGO ELECTRONICS	9- 28	12 3/8	+2	+19.2
N	MOHAWK DATA SCI	2- 13	2 3/4	+ 1/4	+10.0
O	ODEC COMPUTER SYST.	2- 6	1 3/4	- 1/4	-12.5
O	OPTICAL SCANNING	2- 8	5 1/4	+ 1/2	+10.5
O	PERTEC CORP	3- 8	2 7/8	- 1/8	-4.1
O	PHOTON	3- 7	3 3/4	0	0.0
A	POTTER INSTRUMENT	2- 9	3	0	0.0
O	PRECISION INST.	2- 6	1	- 1/4	-20.0
O	QUANTOR CORP	4- 10	5	+ 3/4	+17.6
O	RECOGNITION EQUIP	2- 8	3 3/8	+ 3/8	+12.5
N	SANDERS ASSOCIATES	4- 18	4 3/8	+ 3/4	+20.4
O	SCAN DATA	1- 6	1 1/2	+ 1/8	+9.0
O	STORAGE TECHNOLOGY	11- 34	12 3/4	+ 5/8	+5.1
O	SYCOR INC	7- 20	8	+1 1/4	+18.5
O	TALLY CORP.	2- 14	3	0	0.0
O	TEC INC	4- 9	4 1/4	- 1/4	-5.5
N	TEKTRONIX INC	30- 55	41 1/2	- 1/2	-1.1
N	TELEX	3- 8	3	+ 1/4	+9.0
O	WANGCO INC	7- 13	9 7/8	+ 1/8	+1.2
O	WILTEK INC	5- 18	5 1/2	0	0.0
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 9	5 1/4	0	0.0
A	BARRY WRIGHT	5- 13	5 3/8	+ 1/8	+2.3
O	CYBERNATICS INC	1- 3	1 1/8	0	0.0
A	DATA DOCUMENTS	17- 50	43 7/8	+2 7/8	+7.0
O	DUPLEX PRODUCTS INC	6- 14	13 1/2	+1 1/4	+10.2
N	ENNIS BUS. FORMS	5- 8	6 1/2	+ 1/4	+4.0
O	GRAHAM MAGNETICS	7- 20	8	- 1/4	-3.0
O	GRAPHIC CONTROLS	7- 12	9 1/2	- 1/4	-2.5
N	3M COMPANY	69- 91	75 1/4	+4 1/8	+5.7
O	MOORE CORP LTD	48- 65	52 3/4	+3 1/4	+6.5
N	NASHUA CORP	32- 58	37 1/4	+3 3/8	+9.9
O	REYNOLDS & REYNOLD	23- 51	24 1/2	+1 1/2	+6.5
O	STANDARD REGISTER	11- 20	14 3/4	0	0.0
O	TAB PRODUCTS CO	6- 23	6 1/4	+ 1/4	+4.1
N	UARCO	15- 23	22 1/8	+2	+9.9
A	WABASH MAGNETICS	5- 8	5 3/8	+ 3/8	+7.5
N	WALLACE BUS FORMS	14- 26	20 3/4	+ 1/2	+2.4

EXCH: N=NEW YORK; A=AMERICAN; R=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR



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